MARINE REVIEW

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MERCHANT MARINE IN FOREIGN TRADE.

WHAT, IF ANY, NATIONAL LEGISLATION SHALL BE ENACTED BY CONGRESS?—EXPRESSIONS OF OPINION INVITED UPON THIS GREAT QUESTION—ANSWERS WILL BE SUBMITTED TO CONGRESS.

The Marine Review has decided to invite expressions of opinion from prominent men in the great lakes district and elsewhere as to what, if any, national legislation should be enacted by congress in order that the United States may increase the number of merchant vessels carrying our flag in the foreign trade. Communications received will be published in current issues of the Review and brought together in pamphlet form to submit to congress when it next assembles.

The undisputed facts appear to be that, whereas, merchant vessels of the United States carried nearly 90 per cent of our imports and exports in 1829, and about 75 per cent in 1855, they carried only about 8 per cent in 1898. Foreign vessels have replaced those of the United States and the foreign owners of these vessels now receive and take away from this country from $150,000,000 to $250,000,000 each year as freight upon our imports and exports.

The Marine Review does not intend at this time to express any opinion as to the causes that have led to these results. It is claimed that they are due to the abandonment of our former policy of exacting discriminating duties upon imports in foreign vessels; or to the effect of the civil war; or to the substitution of metal vessels propelled by steam for the old-time fast sailing wooden ships; or to postal, naval, construction or other subsidies paid by foreign nations to encourage the creation and maintenance of their merchant marine; or to the cheaper cost of construction, wages, supplies, etc., abroad, due chiefly to the higher price of labor in this country; or to the lower rate of interest for which foreign capital can be obtained. These and many other causes have been suggested by theorists. As practical men, we want to deal with existing conditions and there can be no serious difference of opinion as to what they are.

Our foreign merchant marine is rapidly disappearing from the oceans and there can be but one cause for this. Citizens of the United States find themselves unable to own and operate merchant vessels in the foreign trade with profit, and years of patient experience have proved that it is impossible for individual effort to overcome the causes, whatever they may be, producing this result. The United States is therefore called upon to consider and decide whether it will continue to permit its import and export trade to be carried almost entirely by vessels of foreign nations, or whether it will support its citizens in an effort to recover and retain its lost position on the oceans. The question is one of grave national importance. It not only involves carrying out of this country $150,000,000 to $250,000,000 of vessel earnings annually, but it also means depriving our citizens of the opportunity to find employment for their labor and capital in ship building and ship supplying industries, than which none other have a more far-reaching beneficial effect upon the general prosperity of a nation. It further involves questions of national defense, as neither ships nor sailors can be created in a day and a navy without sailors and merchant vessels as auxiliaries, transports, etc., is useless for offensive or defensive operations. A nation without modern ship yards is dependent upon foreign nations for the creation and maintenance of its naval establishment. The story is a long one, but enough has been said to explain why the Marine Review deems it important to obtain a general expression of opinion, before congress assembles, as to what the national policy should be upon these great questions:

1. Shall the United States continue to allow its merchant marine in foreign trade to fight a losing battle until it entirely passes out of existence and foreign nations absorb the ocean carrying of our entire import and export trade?

2. Shall the United States decide, as its permanent nonpartisan public policy, that an equitable share of its imports and exports must be carried on vessels of the United States, built in our own ship yards and flying our own flag, and that congress will enact whatever national legislation may be needed to stimulate and encourage our citizens to create, maintain and operate the vessels this policy calls for?

3. If it is recommended that congress shall enact remedial legislation what shall it be, and why?

These are the important public questions upon which the Marine Review invites expressions of opinion from patriotic citizens who are interested in the permanent welfare of their country. Communications should be addressed to the Marine Review Pub. Co., Perry-Payne building, Cleveland, O.

THE BIG COAL INTERESTS.

Although the coal mining interests and important dock terminals of all the large coal companies that engage in forwarding Pittsburgh coal over the great lakes are included in the $64,000,000 consolidation known as the Pittsburgh Coal Co., there is, of course, as yet no apparent change in the conduct of the business by the old companies. This will not come until the issue of stock in the new company is completed, and officers elected, and even then it will be necessary to go slow in transferring to one management the important interests that are represented in this combination. The election of officers will take place in a very short time now, and it is still understood that, notwithstanding the large amount of Pittsburgh capital in the company, the lake shipping interests of Cleveland will be represented by Mr. Frank Osborne as president, with D. R. Hanna on the board of directors, and Mr. Baine of the Morgan, Moore & Baine Co., as secretary. The importance of this coal consolidation will be understood when it is stated that it embraces the properties, "goodwill and fixtures" of such firms and companies as the New York & Cleveland Gas Coal Co., the oldest in Western Pennsylvania, annual productive capacity 1,500,000 tons; F. L. Robbins' interests, ten companies, capacity 1,700,000 tons; M. A. Hanna & Co., four companies and five leaseholds, capacity 1,300,000 tons; Osborne, Saeger & Co., five mines, capacity 1,200,000 tons; W. P. Rend, four mines, capacity 600,000 tons; Essen Coal Co. (Pickands, Mather & Co.), three mines, 600,000 tons; J. H. Somers Fuel Co., 500,000 tons; Johnson Coal Mining Co., 600,000 tons; Youghiogheny Coal Co. (W. L. Scott estate), ten mines, 1,400,000 tons; Moon Run and Imperial coal companies, both of which own and operate railroads of their own, omitting lesser, but important, interests. The output of coal of the several mines of the proposed federation during 1898 was 15,274,433 tons, or more than any state outside of Pennsylvania, except Illinois. The mines have a feasible output capacity of over 22,000,000 tons, if it becomes necessary to push their operations to the full limit.

"And yet there are others, to use a popular phrase," said a coal operator after glancing over the foregoing figures. "I mean other districts that have properties of even greater tonnage. The Morgan interest in the Hocking Valley of Ohio will soon be a power almost equal to Pittsburgh consolidation, and the progress that is being made towards great outputs in the West Virginia field is amazing. Take, for instance, the growth of the Montana Coal & Coke Co. of Fairmount, W. Va. Only a few years ago they were not looked upon as competitors in any market beyond the immediate surroundings of their mines. Now their output is probably larger than any individual interest in the country. They will produce about 1,800,000 tons of coal this year. The development of this West Virginia district, where the coal lands are said to be now all practically bought up by big operators, together with the consolidations that are going on in other fields, go to show the wonderful increase in consumption of soft coal during the past few years."

OPENING UP OF OLD AND NEW IRON MINES.

With prospects of $5 or $6 a ton being paid for the Bessemer ore product of the Lake Superior region when contracts are made in the winter for next year's delivery, all manner of development work has been undertaken of late on the different ranges. Despatches from the mining country tell of diamond drill work and the opening up of old properties everywhere. A Duluth correspondent says:

"It has recently come to light that more than $500,000 have been expended in mineral lands and a search for ore in the northeastern corner of Minnesota, in Cook county, where the indications have been regarded by many as good. One company has bought there about 35,000 acres, paying from $1,500 to $2,500 for single quarter sections, and has operated at times as high as four diamond drills. All last summer they had four drills working, and since then two have been busy steadily. What has been found is not known, but the discoveries are said to be encouraging. It is the common report, but how much foundation it may have I do not know, that German capital is back of the enterprise. Assuredly some outsiders must be furnishing the money, for the men known to be identified with the enterprise cannot. There are very large tracts in Cook county that have for years been known to carry favorable indications of iron and other economically valuable ores. Many experts, however, consider these ores practically valueless for various reasons.

"The Oliver Iron Mining Co. is examining the Aurora mine, Gogebic range, with the usual view, that of purchase. It is quite probable that the company will take it. Aurora is the property of the Aurora Mining Co., of which W. J. Olcott of Duluth is general manager. It lies next to East Norrie, and is one of the best mines of the range, so far as quality goes. The Aurora has just sunk a deep shaft, and is now completing cross-cuts to get the ore that lies around the western shafts and to discover new lenses. The Pabst of the Oliver company lies adjoining Aurora to the east. Another mine of the Wakefield group, the Comet, has been taken under option by the Corrigan interests, and will be opened at once. The Jack Pot, close to Colby, has been taken by Jones & Laughlins, and is being unwatered. It was the last idle property between Ironwood and Bessemer. The Ashland mine, under control of the Hayes brothers, well known on the Gogebic, is getting water from its lower levels, and will be mining to the bottom of the eighth level. It is hoisting about 300 tons, and has 140 men at work. Shaft No. 2 of Norrie is to be re-entered on account of this unwatering of Ashland. The first ore from the new Davis mine, this range, has been shipped. The Mikado has begun hoisting."

H. C. Frick, chairman of the Carnegie Steel Co., Ltd., returned from Europe this week.

SHIP INSURANCE.

THE INTERNATIONAL LAW ASSOCIATION ADOPTS A SET OF REGULATIONS ON THE SUBJECT WITH THE RECOMMENDATION THAT THEY BE ENACTED INTO LAWS.

The International Law Association, in session at Buffalo, adopted last week, after a bitter debate, a series of marine insurance rules with the recommendation that they be enacted into laws. The first three of the thirteen rules were committed to a special committee to report at the next conference of the association. The rules are as follows:

CONSTRUCTIVE TOTAL LOSS.

1. That, in case of damage, the test of constructive total loss of ship should depend upon whether the whole cost of recovering her and making her fit for the same service as before would exceed her value when recovered and repaired.

2. That, in case of damage, a constructive total loss of cargo should be allowed when and only when owing to perils insured against it cannot be carried forward to the destination, or if so carried would not arrive in specie; or when owing to perils insured against, the carrying ship cannot complete the voyage with the goods, and the ship owner does not forward them, and they can only be brought to the destination by incurring expenses of recovering, conditioning and forwarding, which would exceed their gross market value on arrival, less expenses of selling.

3. That the right to claim payment of a total loss should depend upon the position and condition of the ship or cargo at the time of giving notice of abandonment; or, at the time of the event happening which has made notice of abandonment unnecessary. The estimate of whether ship or cargo is a constructive total loss should be with reference to the apparent and probable circumstances at the time above defined.

The other ten rules, with amendments, as indorsed by the conference, are as follows:

4. That the right of the insurer to the salvage, upon payment of a total loss, should relate back to the time of the casualty which caused the loss.

5. That freight earned by the ship by completing an insured voyage after transfer to the insurer should be apportioned between the assured and the insurer in proportion to the distances run by the ship in earning that freight before and after the casualty.

6. That an insurer of freight who insures against partial loss should indemnify the assured in respect of freight loss by him owing to a constructive total loss of ship, although the whole freight may have been earned by the ship after transfer to the insurer of ship.

PARTICULAR AVERAGE OF SHIP.

7. The deductions from the cost of repairs in respect of new for old, for ascertaining the amount of a partial loss of ship, should be those allowed by rule XIII, of the York-Antwerp rules of general average.

SEAWORTHINESS AND NEGLIGENCE.

8. That in any insurance of ship, or of any interest dependent upon ship, the assured (subject to express agreement) should be considered to warrant as follows:

(a) That where the insurance first attaches in port all reasonable care has been taken, the ship then, in a fit condition, to lie there.

(b) That all reasonable care will be taken to make the ship fit and properly manned, equipped and documented for her voyage on each sailing from any port durling the currency of the insurance; provided that where the voyage includes more than one stage it will suffice that care be taken to make the ship fit and properly manned, equipped and documented at the beginning of each stage for that stage.

9. That the insurer should not be liable for any loss consequent upon a breach of the warranty stated in 8, although proximately caused by a peril insured against; but that the insurance should not be conditional upon performance of that warranty and should not be invalidated by a breach of it.

10. That no other warranty of seaworthiness should be implied in insurance of ship or interests dependent upon ship; nor should any such warranty be implied upon an insurance of cargo.

11. That subject to the warranty stated in 8 an insurer should be liable for any loss caused proximately by a peril insured against, although brought about or contributed to by neglect of the assured, or by neglect or wilful act of his servants or agents, or by an inherent vice or weakness of nature or unsoundness in condition of the thing insured.

DOUBLE INSURANCE.

12. That in cases of double insurance the English rule should prevail. The assured may in such a case recover in respect of loss under any of the policies covering it, in any order unless he has already received indemnity for the loss as estimated upon the valuation in that policy, the insurers being entitled to contribution inter se.

13. That the assured should not be entitled to return of premiums on the ground of double insurance where the risk has attached.

REMARKABLE WRECKING JOB.

The successful conclusion of a very remarkable wrecking job would seem to be in sight if credence may be placed in the report from Peconic, Long Island, that the old Baltimore clipper ship Macaulay, which has been ashore there for ten months, is likely to soon be released. The vessel went ashore in a gale last November and for much of the time since the Merritt-Chapman Wrecking Co. has been at work on her. The oaken hull, it is stated, has been strained somewhat by the efforts to haul her off but not sufficiently to damage her materially. The vessel lies hard on the sands for 176 feet of her length, and two long 8-inch hawsers, running over her stern to an anchorage many yards out, have kept a steady pull on the hull for weeks, any possible slack being taken up within the ship by power from a wrecking engine, which had been set up in her chiefly to operate a dredge that is scooping out a channel in the sands along her keel. The Navesink, one of the two ships which were swept on shore with the Macauley, is to be burned where she lies.

TWO STORIES OF SHIP YARDS.

No more forceful illustration of the increasing degree of interest with which the general public has come to regard the business of building ships —naval and mercantile—and the men who are instrumental in the conduct of the industry, can be cited than the eagerness with which personal anecdotes of ship builders are sought by newspapers and magazines of all classes. The Philadelphia Post tells a good story in which Irving M. Scott, general manager of the Union Iron Works, San Francisco, is the chief figure. After referring to Mr. Scott's humble beginning in San Francisco in 1860, when he arrived there with a cash capital of just $5, the Post tells of the inception of the Union Iron Works by the Scott brothers and quotes the builder of the Oregon as follows:

"We went into the mining business exclusively. We made the best mining machinery in the world. We made it better and quicker than anyone else and we soon controlled the trade. Our work was admitted to be the finest ever constructed. Most of it was our own invention. I, myself, might have made a fortune out of my inventions if I had had them patented, but I did not think it was worth while at the time. We did most of the work for the great Comstock Lode and made money fast. After the Lode played out it made hard times in mining circles and we turned our attention to ship building. That is the way we got into business.

"The Union Iron Works had a hard struggle to secure the contract for the Charleston, the first of the United States naval vessels which they built. Irving M. Scott spent eleven months in Washington and then only secured permission to look at the plans during the last weeks of the time. In speaking of their experiences with this vessel, the general manager said: 'I told Mr. Whitney the plans were defective, but he told me to go ahead on the lines laid down. He said that the plans were English, and if the ship turned out a failure it would be attributed to the change. So I followed the plans, and after the ship was completed the government paid us a great many thousand dollars for making the very changes I had first suggested.'"

Another story that brings out some heretofore unclosed facts has reference to the yard of the Newport News Ship Building & Dry Dock Co. at Newport News, Va. It is said that this yard was especially established for Archer M. Huntington, the son of Collis P. Huntington. It was intended that the young man should follow what seemed to be a natural inclination and become a ship builder, but the plan failed, for Mr. Huntington, Jr., showed a greater preference for letters and had, ere long, made a creditable name as a student of Spanish literature. Mr. Huntington, Sr., then sought to sell the yard but failed to find a purchaser, at the same time discovering what he believed to be a desire on the part of some of his rivals to take advantage of his supposed inexperience. With characteristic decision he determined to fight it out, and doubling the size of the plant he secured within a very short time his share of the naval work.

WIRELESS TELEGRAPHY AT THE YACHT RACES.

Mr. George L. Norton, editor of the Marine Journal, New York, who has the management of the excursion on the Plant line steamer La Grande Duchesse to the international yacht races off Sandy Hook, has made arrangements with one of the leading daily papers of New York City to report from the decks of the Duchesse by wireless telegraphy the full details of the contest. Great interest will naturally attach to the event, as it will mark the first effort made on this side of the Atlantic to put the wireless transmission of messages to any such use. The value of the Marconi invention is becoming better appreciated daily. This is due in a measure to the uses to which it was put during the recent British naval maneuvres. At San Francisco a few days ago it was utilized to report the arrival of the United States transport Sherman from Manila.

The arrangement made for sending messages during the yacht races is to have a cable ship stationed at some convenient point and connected with the cable, the land end of which is at Coney island. The cable ship will at times be 20 miles or more from La Grande Duchesse, but it is claimed that it will be possible to receive messages on the latter and transmit them to London in one minute's time. The Duchesse is particularly adapted to the work from the fact that a long spar is necessary in order to convey the sound successfully. The fore truck of La Grande Duchesse is 135 feet from the water line, upon the extreme top of which will be placed at right angles a short gaff, or arm, about 3 feet long. From this arm is suspended an insulated wire, the lower end of which connects with the operating instruments in a room immediately below the arm or gaff.

SYSTEM OF LIGHT-HOUSES FOR PORTO RICO.

Capt. Adam Stierle of New Haven, Conn., who for more than twenty years has been engaged for a considerable portion of his time in the construction of light-houses for the United States government, has just been ordered to Porto Rico on work in connection with the mapping out of an entire new system of light-houses for the island. The policy of the Spaniards in this regard was parsimonious in the extreme. There are only three light-houses on the entire coast that are in any degree serviceable. One of these is outside the harbor of San Juan; another is at Ponce, and the third is off the northeast cape. There are other structures but they are not of much account. About a dozen light-houses are needed in the vicinity of the island, but owing to the condition of congressional appropriations the extent of operations in this line will be governed by the condition of the revenues of the island. The erection of light-houses at Porto Rico will inevitably prove an expensive work, although there is to be found on the island abundance of stone well adapted to the purposes of construction. The ravages of the recent hurricane in the territory have, however, emphasized the necessity of erecting structures sufficiently staunch to withstand the most violent storms. The most imperative need for a new lighthouse on the Porto Rican coast is on the west coast which is entirely unprotected.

Fred. Baldt of Chester, Pa., inventor of the well known stockless anchor which bears his name, has just been granted a patent for some valuable improvements devised for the manipulation of ship rudders.

DEVELOPMENT OF SHIPPING ON THE PACIFIC.

COMMISSIONER OF NAVIGATION CHAMBERLAIN POINTS OUT THE ADVANTAGES WE HOLD OVER EUROPEAN NATIONS THAT ARE PAYING SHIP SUBSIDIES FOR THE ENCOURAGEMENT OF TRADE WITH CHINA AND JAPAN.

Some of the strongest arguments presented in favor of the passage of the Hanna-Payne subsidy bill have been those eminating from the office of the United States commissioner of navigation, Mr. Eugene T. Chamberlain. In discussing the possibilities of trade development on the Pacific for the Washington correspondent of the New York Sun, Mr. Chamberlain said:

"There is not any sanctity or mystery about foreign ocean mail contracts which puts them above the plane of reasonable propositions to promote American shipping. The theory that the former afford examples of the disinterested patriotism of our competitors, while the latter are the evidences of the greed of American ship owners and ship builders will not stand five minutes' examination. The most important contracts at this time are those of Great Britain, Germany, France, Italy and Austria-Hungary for mail service to the eastern coast of Asia (China, Japan, Cochin China, etc.). These five nations spend annually $4,500,000 for their mail lines to the east coast of Asia, according to figures given in last year's report to the German Reichstag. The United States, it may be added, for its Asiatic mails in 1897 paid $23,000 to American steamships and $14,000 to foreign steamships. This sum of $4,500,000 is not expended by those nations for the exclusive purpose of sending the mail from London, Berlin, Paris, Marseilles, Vienna, Trieste, and Brindisi in the shortest possible time to Hongkong, Shanghai, Kiautschau and Yokohama. The time made by the subsidized foreign steamships on this route is not the shortest practicable by an average of about five days, and if delivery of the mails were the main object sought to be attained by these contributions to steamships, the completion of the various Pacific railroads of North America, the use of triple expansion engines and steel hulls ended the need for the expenditure.

"The British Peninsular & Oriental line agrees to carry the mails, under its latest contract, from Brindisi, Italy, to Shanghai in 736 hours. The Peninsular & Oriental Brindisi express train, with its channel connections, takes the mail from London to Shanghai in 780 hours, or 35 days. The best that the company does is to cover the distance in 32 or 33 days, and its lines are faster than those of any other nation on the route. Under its new contract the North German Lloyd undertakes to carry the mails from Berlin to Shanghai in 32 days. Mails are now brought across the Atlantic to New York in nine days from Berlin, and eight days from Paris. Seven days is not a low limit at the present time for mail steamships from Liverpool to New York. The running time of our fast mail train from New York to San Francisco is now four days and three hours. Any letter ought to reach San Francisco from Berlin or Paris within thirteen and one-half days, and letters doubtless do cover that distance in shorter time. The distance from San Francisco to Shanghai by way of Yokohama is 5,709 nautical miles. A 17-knot steamship, such as the two Pacific Mail steamships now building at Newport News, can traverse the distance in 14 days, and probably will do it in 15 days. The establishment of a fortnightly American service from San Francisco to Shanghai, which is one of the objects proposed and to be accomplished by legislation introduced at the last session of congress, will bring Berlin and Paris, not to mention British ports, within 28 or 29 days of Shanghai, and under favorable but not extraordinary conditions, within 27 days, while the best British achievement and the best German promise by subsidized routes is now 32 days, and the average is 33 or 34 days. If quick mail communication between the capitals of western Europe and China and Japan were all that is to be accomplished by the expenditure of $4,500,000 annually on their steamship lines, time and money could be saved by the development of the American route. We shall be disappointed, however, if we look to these quarters for support of a bill which would increase American shipping and at least incidentally improve the world's ocean mail facilities.

"Whatever may have been the fact in the recent past, there is very little substance in the notion that the present large subsidies to foreign lines to Asia are to secure the quickest transit for the mails. There is not much more in the claim that they are for necessary political purposes. The new German contract does not even prescribe a regular connection with Kiautschau, but leaves that matter open for future decision. The only connection with German possessions in New Guinea provided under the new or old contract is a 12-knot steamship of 2,500 gross tons (similar to our Cherokee), which once in eight weeks runs between Singapore and New Guinea. On the Asiatic coast, this side of Singapore, Spain's political interest, the Philippines, which have now come to be ours, was greater in population and (I think) in area than those of Great Britain, Germany, France, Italy and Austria-Hungary combined, and on political grounds we have better reason than any other nation, with the possible exception of Japan, to develop our shipping on the Pacific by the most feasible means at hand.

"In point of fact, the Peninsular & Oriental, the North German Lloyd, the Messageries Maritimes, the Societa Navigazione Italiana, and the Lloyd Austriaco companies are now backed up liberally by their respective governments as a means of promoting trade, and especially the export trade in manufactured goods of Great Britain, Germany, France, Italy and Austria-Hungary with China and Japan. There is no effort at concealing this fact in the reports of the companies every year, and there is nothing discreditable for the United States to adopt the same policy. Whether it be profitable or not depends on a balance of the value to the country of the trade to be acquired and the extent of the investment necessary to obtain it. To the government which makes these foreign contracts they mean carriage of the mails and the increase of national prestige; to the manufacturers and labor of the country they mean increased opportunities for commerce; to the ship owners they are a comfortable addition to receipts and an opportunity for the employment of capital, and to ship builders they afford a better chance to build ships. To the United States these foreign contracts must seem a very sagacious means of obtaining national wealth and influence from which we shut ourselves out."

THE OTHER SIDE OF NEW YORK'S CANAL PROBLEM.

Mr. C. V. R. Ludington of Monticello, N. Y., who has written some very spirited communications to the newspapers in opposition to the big canal enlargement schemes now under consideration in New York state, says in a communication to the New York Sun:

"Had Clinton projected either of the railroad lines now existing between New York and Buffalo twenty years before the canal was built, neither the Erie canal, nor any other canal in this or any other state would ever have been built. I believe further that no parallel instance to the contrary can be cited in this or any other country. We now have 182,000 miles of railroad lines in operation in the United States, 20,000 miles more than in all Europe, more than 5,000 miles of sea coast, and many thousands of miles of lake and navigable rivers, and still we find men of influence, intelligence and patriotism urging the 'expansion' or enlargement of our old canals to meet the demands of commerce and the wants of our people. They are owned by the state, and, of course, non-taxable, bearing none of the enormous burdens of our railroads, whose annual contributions to the support of the government and its institutions reach millions, whether they earn anything to their owners or not. The state is thus placed in the abnormal position of being a competitor with its greatest supporters for the trade and commerce of the people, with agencies that have added thousands of millions to the wealth and population of the state and country, built cities, villages, hamlets and opened the wilderness to settlement, unaided by canals, rivers or seaports.

"What have our canals done, useful as they confessedly have been in their day, in this direction, unaided by railroads or navigable waters? Look at the cordon of cities and manufacturing towns now lying along our trunk lines of railways, and tell me how many of them, and which they were, that met the eye before these channels of travel and commerce were introduced? If the canals, still held by the state and backed by its great and sovereign power, were in the hands of private corporations or individuals, they could not stand the competition of steam and the rail one hour. Your correspondents grow eloquent over French, Prussian, Belgian and German statistics (Great Britain left out). They are all irrelevant to the subject. We are no longer led by foreign policies, civil or military. Gladstone, the great commoner, once aptly said, we have a 'world of our own.' The Kaiser of Germany, following the lead of our great Clinton, suggests the opening and building of canals to convey cheaper American bread-stuffs to his people, but his Diet is against him. What have we to do about it? Conditions are not alike everywhere. We have Texas, one state alone larger than all Germany from the Tyrol to Pomerania, with her free cities, duchies and kingdoms, without any canals, but she has thousands of miles of railroad lines.

"Why don't the canal advocates give us full statistics respecting our canals, their tonnage, past and present, whether increasing or otherwise, the cost of administration, how much of the 368 miles of the Erie canal was enlarged by the $9,000,000 appropriation, and what it will cost to widen the remaining miles? What is its maximum capacity, and if it was ever reached? The amount, from first to last, that the people have paid in taxes for repairs, enlargement and superintendence? These things are germain to the subject, and all within reach, if the accounts have been properly kept; and which of them the people could the better dispense with, if they were forced to make a choice, the canals or railroad competing lines?"

REFITTING THE SPANISH CRUISERS.

The United States navy department has just made public the full text of the report of Naval Constructor R. P. Hobson with reference to the repairing and refitting of the recovered Spanish cruisers in the Philippines. In the wrecking operation on the Isla de Cuba the first move made was to send down divers to stop the openings in the hull. Bulwarks were built up with 12-inch planking, so that the top was above water at high tide. Three centrifugal pumps were mounted on board. Several attempts had to be made before the vessel could be finally pulled off. The Isla de Luzon and the Don Juan de Austria were pumped out without much trouble. The vessels went to Hong Kong under their own steam, but inasmuch as they encountered rather heavy weather arrived in semi-sinking condition.

The principal damage on all three vessels was done by fire, which, in consuming the woodwork, caused heavy warping and frielding of the adjacent metal work. The damage from corroding, though general and requiring the overhauling of everything, was not excessive.. It was no small task to clean the vessels, the accumulations amounting to many tons, everything being choked and clogged and every square inch throughout hull and fittings requiring scraping. In refitting the vessels a number of structural changes were required in order to make the vessels efficient. One change was the provision of some new coal bunkers and the transformation of several of the existing bunkers into store rooms. The frames and floors beneath the boilers were found to be in wretched condition, owing to neglect, and had to be renewed by taking off the bottom plating. The repair work was much delayed by the difficulty encountered in securing material.

THE SLIDE VALVE—TENNANT.

The latest number of Spon & Chamberlain's series of practical handbooks is a revised edition of "The Slide Valve, Simply Explained" by W. J. Tennant. The revision and enlargement of the work has been done by J. H. Kinealy, D. E., professor of mechanical engineering in Washington university, and author of "Steam Engines and Boilers," and needless to say it has been well done. The work is based, says the author, upon notes and diagrams prepared with no more ambitious object, originally, than to help railway students toward the obtainment of clear, general notions upon the important subject of the slide valve. By diagrams and sketches it has been sought to clear up graphically many of the incidental minor difficulties relating to the subject. The book is published by Spon & Chamberlain of 12 Cortlandt street, New York City, and cloth bound retails at $1.

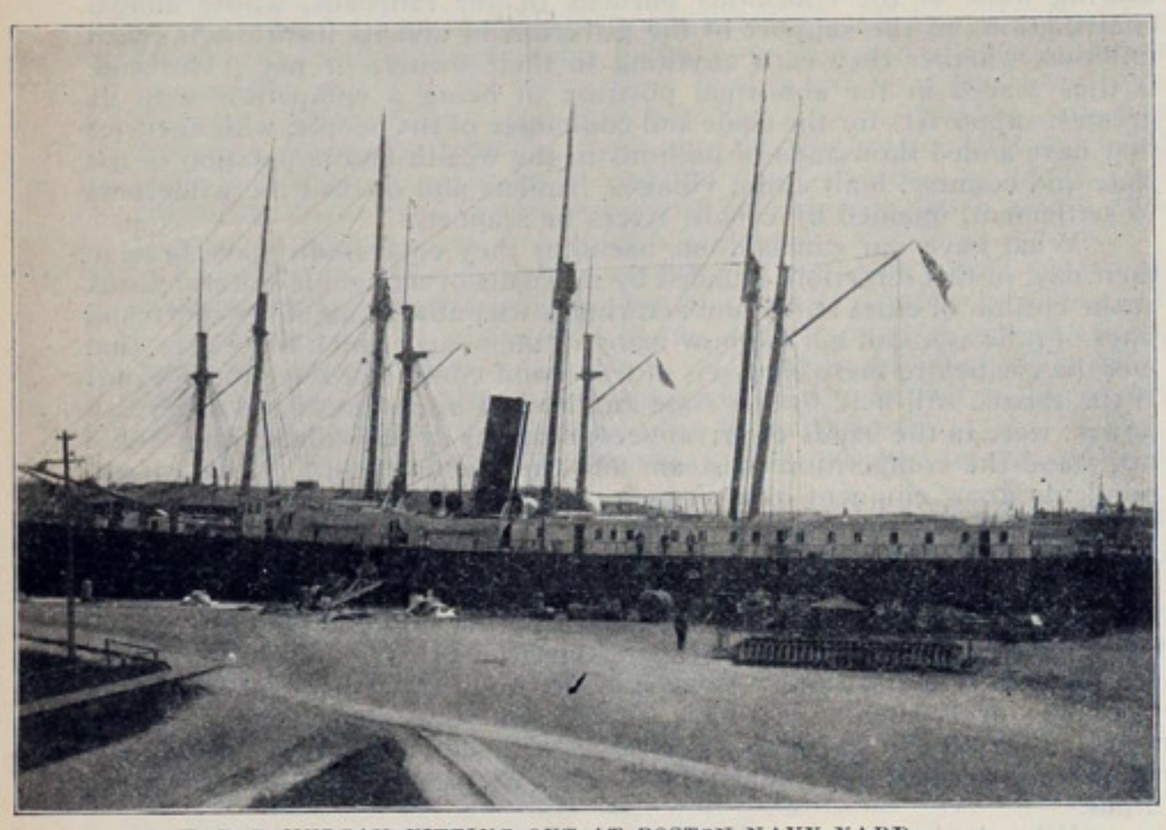
Merchant & Co. of Philadelphia recently made a shipment of 30,000 pounds of seamless drawn condenser tubes to Glasgow, Scotland.

A FOUNDRY AT SEA.

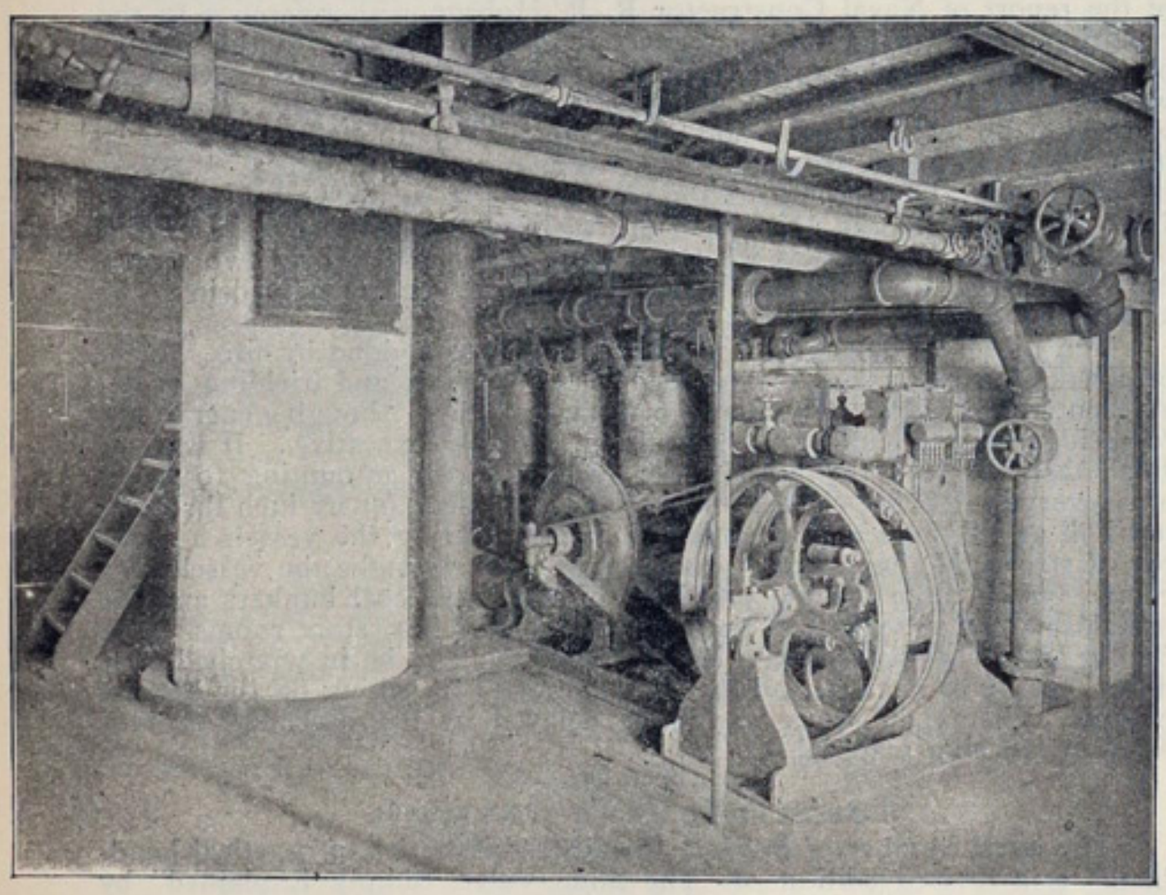
LIKE OTHER DEPARTMENTS OF THE REPAIR SHIP VULCAN IT WAS COMPLETE IN DETAIL AND PROVED CAPABLE OF EFFICIENT SERVICE.

During the brief but arduous service of the United States naval repair ship Vulcan in West Indian waters when our government was involved in trouble with Spain, no department of this novel vessel was subjected to more active service than the foundry. Its work, was ,however, overlooked in a considerable degree at the time and it is therefore a matter of considerable satisfaction to be enabled, through the courtesy of the Foundry of Detroit, to reproduce a review of operations in this department of the ship, condensed from the Engineering Magazine.

Before the late war, the engineer-in-chief of the navy, Rear Admiral George W. Melville, brought to the attention of the secretary of the navy, "the desirability of making such preparation for the fitting out of a vessel which would be a floating repair shop as would enable the work to be done with great rapidity when needed." Fitted out with the most approved workshop appliances, with a large and varied assortment of engineers' and ship's stores, and a picked complement of skilled mechanics, the Vulcan was pre-eminently an "engineer's ship." The project was in no sense an experiment. Had it been looked upon as such, it passed beyond the experimental stage in less than twenty-four hours after reporting for duty to Admiral Sampson. The Chatham, now the Vulcan, was the sister ship of the Berkshire, built by the American Ship Building Co. of Philadelphia in 1884. She was well designed, strongly built, and for years



U. S. S. VULCAN FITTING OUT AT BOSTON NAVY YARD.

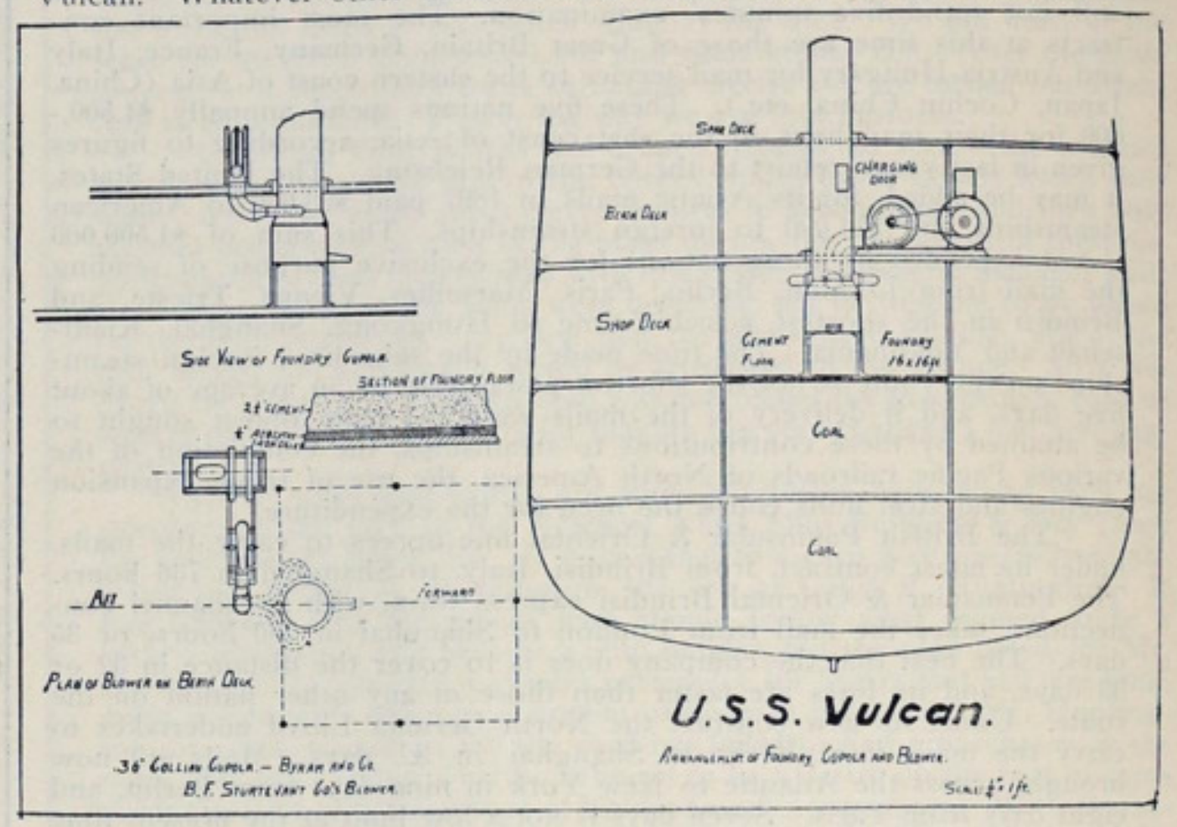


VIEW OF FOUNDRY CUPOLA AND BLOWER ON BERTH DECK.

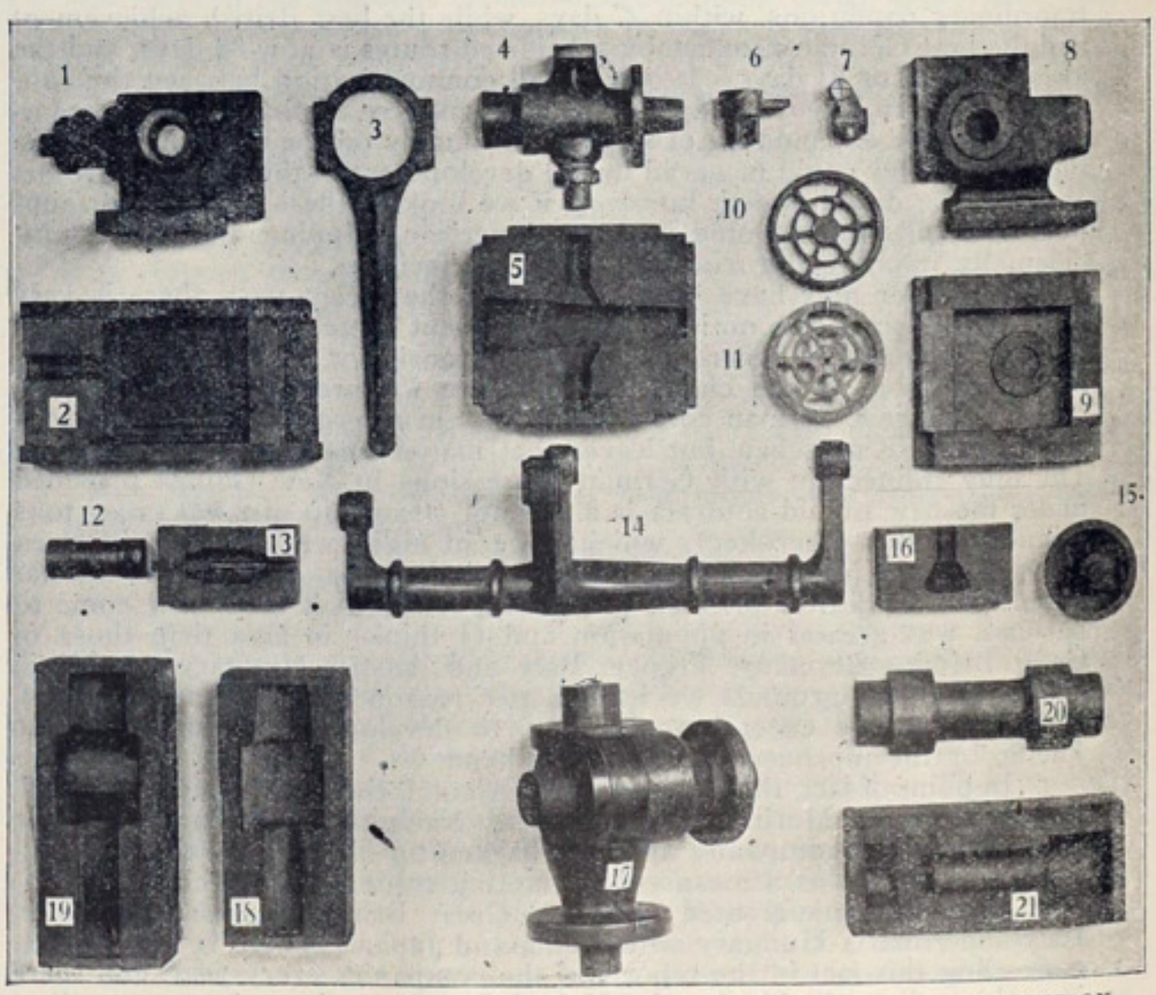
had been a credit to the early work of this company. The original interior arrangements seemed to be particularly adapted to meet the requirements of her new line of service in the auxiliary navy. On each deck were ample gangways on each side of the engine house, and large cargo ports on each side, two forward and two aft. These gangways greatly facilitated supervision, and permitted of an extension of the shop work from stem to stern, all on one deck, to be fitted up and thereafter known as the "shop deck."

The head room was 7½ feet between the shop deck and the deck beams above. Belts from line to counter-shafts and all other athwartship belts were in the way of standing erect under them, but did not seriously interfere otherwise with working the machine tools. This available head room below belting varied somewhat according to circumstances, but the projecting adjusting screws of the hangers proved much more exasperating. Officers and men, however, became accustomed to dodging both. The installation of the forge blower and hot-air exhaust system was employed. The former was a "Monogram" Sturtevant blower, with 7-inch discharge driven from the forward line of shafting; and the latter was equipped with a standard Sturtevant exhaust fan, with 23-inch discharge, and driven by a 3 by 4½-inch engine. New England mechanics, working nine hours a day, 'tween decks, off the south coast of Cuba, in mid-summer, required all the fresh water and air they could get. The next best thing to the forced circulation of fresh air was to have all of the foul air and smoke from the forge fires exhausted, and this arrangement proved of inestimable value.

A foundry at sea had not been heard of before the cruise of the Vulcan. Whatever other kinds of naval repair work had been executed heretofore on board ship, that of making large brass and iron castings had not been attempted. In her facilities for this new line of work the Vulcan stands pre-eminent and alone. That the unique equipment for foundry work was successful is more than shown by the fact that thousands of pounds of iron and brass castings were made and finished for the ships of the fleet. The brass furnaces were kept in almost constant service, sometimes running off two heats a day, and making it necessary to carry the work far into the night, much to the discomfort of the men, who were trying to get some sleep and rest before another day's work. In iron casting not more than one heat was run off in a day, and that



ARRANGEMENT OF FOUNDRY CUPOLA AND BLOWER.



GROUP OF TYPICAL PATTERNS FOR CASTINGS AND REPAIR WORK FINISHED ON BOARD THE U. S. S. VULCAN.

usually about 3 o'clock in the afternoon. For after filling the molds and dropping bottom, it was practically impossible to do much more in that part of the ship till the next morning. Kipling has sung for the Scotch engineer and stoker, but there was no heaven-born genius on board the Vulcan to treasure up the memories and scenes incident to dropping bottom. The usual luxuries of such work ashore were entirely missing. Like the fiery furnace of old, the heat seemed seven times more intense than it was wont to be ashore.

The foundry floor was made by cutting away the 3-inch wood planks of the shop deck to the steel deck-plates below, laying down one-half inch asbestos board and then filling in to the original level of the deck with concrete, mixed in the proportion of one part of Portland cement to one and one-half of sand. Directly beneath the cupola a fire-brick floor was laid in cement on the asbestos board, and a cast iron foot piece placed in the center to receive the bearing bar of the cupola bottom. It was rarely possible to get all of the flasks on such of the space as might be available of this 16 by 16-foot foundry floor. Many of the molds had to be poured on the wood deck surrounding it, a liberal supply of water and of wet sand being kept in readiness for any emergency. The cupola had a melting capacity of from 3,000 to 4,000 pounds of iron an hour, or a total capacity of five tons, being 27 inches inside diameter. It was charged from the deck above the foundry floor, as shown in one of the illustrations. In the same view will be seen the No. 5 Sturtevant cupola blower, supplying an air blast through 9¾-inch discharge pipe, of from 4 to 12 ounces pressure, according to circumstances. The time required for a heat was usually about forty-five minutes, from turning on the blast till pouring ceased. Whenever the cupola was operated fire pumps were kept running, and men stationed at the fire mains with hose and buckets ready for any emergency. On the spar deck and topsides bucket men were also stationed, to guard woodwork, rigging, sail-cloth, etc., from the sparks of the cupola.

There were two brass furnaces, 12 by 12 inches and 16 by 16 inches inside lining, respectively, located on the foundry floor, on the starboard side of the cupola. They had each a separate stack, placed aft of the cupola and extending a short distance above it. The total height of all of these stacks was about 33 feet above the foundry floor. The intense heat from the brass furnaces and stacks, and from directly over the cupola tap hole, proved the most difficult problem in this part of the Vulcan's equipment. The whole wooden deck above the brass furnaces and the foundry floor was protected by asbestos board, overlaid with tin. Sheet iron was placed between the deck-beams above the tap hole, giving about 8 inches of clear space between it and the wooden deck above for the free circulation of air. A heavy covering of asbestos was placed around the brass furnaces and the foundry cupola. In the latter case it was extended from the bottom of the 37-inch shell of the cupola to the topsides of the ship. The stacks of the brass furnaces were lined with cylindrical fire-clay pipe, with cemented joints throughout their whole length. Free circulation of air was allowed around all of these stacks by cutting away the wooden decks and fitting with ample coamings. This proved entirely satisfactory for the cupola. It was found necessary, however, to open up more and more the air space around the brass furnace stacks. The horizontal and inclined portions of these stacks, just below the berth deck, were provided with heavy asbestos coverings to further protect this deck from the excessive radiation of heat.

In addition to the foundry equipment above described, there was a forge shop, a plant with special arrangements for removing the smoke, and preventing the overheating of the space between decks. This arrangement consisted of a large steam fan and a system of exhaust piping, installed by the B. F. Sturtevant Co., whereby large volumes of air were continually exhausted through the forge hood pipes, thereby securing the double result of cooling and ventilating the space. In the matter of making this space comfortable for the workmen, it is stated that "this arrangement proved of inestimable value."

Incandescent lamps were fitted throughout, in store rooms and on the shop deck, in addition to those which had been originally installed, and arranged to suit the conditions of the work. Three long-burning enclosed arc lamps were placed in the machine shops. With glaring forge fires and brilliant arc and incandescent lights the ship was no doubt nightly exposed to Spanish Mausers off in the mountain passes and lying low in the rifle pits around the shores of Guantanamo bay, and on the first night orders were issued to put out all lights, but it soon became apparent that the Vulcan would never get through with the work unless allowed to work at night.

After many days the officers had learned by experience the specialties of all of the men. Only then was it possible to assign them to work and duties for which they were more or less thoroughly adapted. The following classification is not according to navy enlistment papers of these men, but according to their several abilities as determined after two months' experience with them:

Machinists	39 with 11 helpers.
Boilermakers	25 with 2 helpers.
Blacksmiths	5 with 2 helpers.
Coppersmiths	5 with 1 helper.
Pipe-fitters	4 with 3 helpers.
Molders	4 with 1 helper.
Electrical machinists	2
Pattern-makers	3
Carpenters	2

SUMMARY.

Workshop force, 89 with 20 helpers	109
Engine and fire-room detail	30
Engineers' yeomen	2
Cooks	7
Ship's crew of the Vulcan	70
Total	218

The Vulcan arrived off Santiago de Cuba just in time to witness the operations along the shores of Aguadores, three miles east of Morro Castle. There were two six-pounders forward, and the services of the ship were tendered to Admiral Sampson. He answered that gunboats and battleships would do the fighting, if there was any to be done, while the Vulcan's sphere of activity was elsewhere. After reporting to the Admiral the Vulcan stood towards the shore, almost under the brow of Borro, so close, in fact, that the Admiral signalled the Massachusetts to bespeak the Vulcan as she rounded to, to keep farther off shore. The Vulcan changed her course, bespoke the captain of the Texas, as he was wetting down the decks and clearing ship for action, and returning farther out to sea, bespoke the Newark, and left the scene of action for Guantanamo bay. This was the first, the last, the only smoke of battle enjoyed by the Vulcan.

The division of the working force into three shifts was maintained only so long as it was absolutely necessary in order that the early rush of work might not accumulate. Those men who were obliged to rest and to sleep at night could get very little of either on account of the noise and the lights. Those obliged to sleep in the daytime fared no better, with noise and disturbances on every hand. The conditions surrounding the men on board the Vulcan were as different from those on a regular naval vessel as could well be imagined. Of course, the work goes on, but long lines of shop shafting, blowers, and hot forges with the accompanying noises of work in forging, boilermaking and machine shop, are not kept in full operation seven days of the week throughout the twenty-four hours. There was no place for the men to rest—no rendezvous, such as they had been accustomed to on shore. The work was continuous, for eight or nine hours, or more, as necessity demanded—quite different from the customary four hours on duty and eight hours off in the regular service. As soon as possible, therefore, the men were divided into two shifts, giving all hands eight hours of rest and quietness.

The group of patterns, shown in one of the illustrations, is thoroughly representative of the wide range of work called for in the line of brass castings. Perhaps they illustrate methods of patternmaking and seem to dictate molding practice slightly at variance with established rules, but the conditions under which they were rushed through must be kept in mind. The core boxes seem to show rough-and-ready construction, but these had to be at hand when the patterns were finished. The pattern boxes and core boxes for the double-valve of the Vixen (17, 18, 19), for instance, were made at one stretch, without rest or sleep for the patternmakers, till all was ready to hand over to the molder. The pattern for the valve-seats for the New York (10, 11), was made from a carefully-executed pencil sketch, furnished the Vulcan. The pattern for the rock-shaft for the Helena (14) was made from a blue print, also furnished for the purpose. All of the other patterns shown in the illustration were made from the original articles sent aboard the Vulcan as samples, and this was the usual practice followed in making patterns for such new parts.

White-metal patterns were made frequently from the first wood pattern, when several spare parts were ordered. This is shown in the case of valve-seats for the New York (10, 11), of which a requisition for thirty-six was filled. The requisition for the plug cocks for the Oregon (4, 5), called for nine castings only, to be afterwards finished by the machinists of the Oregon in their own shops; and these were not to replace any broken parts. A 6-inch Spanish shell had penetrated the Iowa, on the starboard bow, a little above the water line, and exploded about 12 feet inboard, where it struck an armor hatch on the berth deck. There were at least 300 holes in the thin steel deck and bulkheads in the vicinity of the explosion. Fragments of the shell passed through, as the armor hatch was blown off, and started a fire on the protective deck below. The Vulcan made an entirely new hatch cover and coaming with all fastenings and trimmed around the ragged edge of the deck, and inserted a new piece of plate.

In the line of ordnance work, gun mounts were made for the new 6-pounders sent down to be mounted on the small converted yachts, alterations were made in old gun mounts, new foundation plates were made for others; and in one case an entirely new bronze casting was completely finished for replacing a cracked gun-mount bracket. Firing pins, gun springs, etc., were made to replace broken or damaged parts and detent triggers of turret guns fitted with new steel blocks.

In the first forty-one days of the Vulcan's work in Guantanamo bay, there were 528 orders for repairs filled and 256 requisitions for supplies.

ENORMOUS FREIGHT MOVEMENT ON THE GREAT LAKES.

The far reaching effect of a stoppage of traffic in the St. Mary's river will be understood when it is stated that freight is moving through that river this season at the rate of a million tons in ten days. This is no guess at the traffic of the river. It is proven by the monthly statements of the canal commerce, as furnished by government officials. It is to be hoped that the sinking of the Rockefeller steamer Douglass Houghton will not block traffic for even half of ten days, as the loss will not fall to the vessel owners alone, but to the grain shippers who are trying to move, almost without regard to carrying charges, an immense crop from the northwest, and to every branch of the busy iron industry, as well as the other important interests represented in commerce to and from Lake Superior.

The movement of freight everywhere on the great lakes is tremendous, and the freights that are being paid amazing—6 cents a bushel on wheat, $4 a thousand on lumber and $2 a ton on ore from the head of Lake Superior. Ore shipments to Sept. 1 exceed the shipments of last year to the same date by 1,504,464 gross tons, and it is now quite certain that the output of the full season will pass the fifteen million mark. Complete returns from all the shipping ports show a total of 10,646,913 gross tons moved to Sept. 1 this year, against 9,142,449 tons on the same date in 1898. The August shipments—greatest month on record—exceeded the three-million mark by 7,207 tons. The ore shipped thus far exceeds by nearly a million tons the entire shipments of 1896 and surpasses also the total for the boom year of 1895.

TRIAL OF THE KEARSARGE.

During a trial off the Virginia capes on Sept. 5 the battleship Kearsarge, just completed by the Newport News Ship Building & Dry Dock Co., maintained for half an hour under forced draft a speed of 17¼ knots. This was with heavy guns aboard and with a year's accumulation of marine undergrowth on her bottom. The contract speed of the vessel is but 16 knots. The test of the steam steering gear proved entirely satisfactory, and on a trial turn the battleship swung completely around in 2¼ minutes. After the secondary battery has been placed aboard, the vessel will be sent to New York to be cleaned and will then have her official trial. The trial was under the direction of General Superintendent Walter A. Post of the ship yard, who was assisted by the foremen of the various departments and a picked crew of 200 men.

OUR NAVIGATION LAWS.

ATTENTION DIRECTED TO THEM THROUGH THE RECENT COMPILATION FROM THE BUREAU OF NAVIGATION—COMPARED WITH BRITISH REGULATIONS.

The navigation laws of the United States, collected in one handy volume by the bureau of navigation, have been so put forth by Commissioner Chamberlain as to attract attention in England, as well as in this country. The Liverpool Journal of Commerce makes comparison in a very interesting way between English law and the law of this country, as a result of having recently received a copy of Mr. Chamberlain's work. The English journal says:

"Ship masters and ship owners of the United States are most carefully catered for by the bureau of navigation at Washington; and the commissioner is to be congratulated upon the clear, yet concise, summary of the various laws relating to navigation and the merchant marine of the United States, which forms part two of his report to the secretary of the treasury for the year ended June 30, 1899. Originally published in 1895, much has happened during the four years. Congress has made many changes in the statutes, the 1895 compilation was exhausted, and the new edition was brought right up to date with respect to the laws actually in force relative to vessels. Its fifty-two parts embrace all that is necessary to guide both ship masters and ship owners when in doubt as to any proposed action. Naturally the laws relating to the rights of the flag come first. Ship builders on the other side of the Atlantic do their level best to prevent any ships brought from other flags being placed under the Stars and Stripes. A wrecked foreign vessel, come to grief on the coast of our near kindred, may be bought by a citizen and claim the flag, provided the repairs put upon such vessel are equal to three-fourths of the vessel's cost when so repaired.

"Rules as to marking the names on bow and stern hold on both sides of the Atlantic. It would be a good thing for all concerned if shipping laws were of international application as in the rules of the road at sea. Every seaman or apprentice has 72 cubic feet, with no less than 12 superficial feet measured on the deck or floor of the apartment. Deductions for crew space and other purposes are also allowed. 'All the officers of vessels of the United States who shall have charge of a watch, including pilots, shall in all cases be citizens of the United States.' This fact does not seem to be generally known. England is almost the only maritime nation permitting foreigners a free range fore-and-aft in its merchant ships. If an American ship is on a foreign voyage, and an officer is required, she may avail herself of a foreigner to fill the vacancy until such time as she arrives at a home port. Executive officers and engineer officers all fall under this heading. Once upon a time anyone might be an officer of an American ship, provided he was exceptionally gifted from a muscular point of view. An officer's license is now necessary for the majority of vessels, which may be forfeited by misconduct or ignorance proved before a court of inquiry. The interests of men before the mast are seriously safeguarded at Washington by the authorities. Three years' service under the flag entitles to naturalization and citizenship under certain conditions laid down. Every facility is offered to men desiring to become citizens. Consequently the increase in the citizen element on board United States warships is most marked of late. Scandinavians evince a proper pride in change of allegiance. Articles of agreement must be explicit, and a copy placed in a prominent position on board ship for the crew's perusal.

"A close comparison between the shipping laws of the United States and this country shows good agreement. Seamen also have discharges, where once it was their proud boast to be quite independent of such peculiarities of British grandmotherly legislation. Now the officers have licenses; the men have discharges. Times have changed during the last thirty years. Every seaman now on a vessel of the United States is entitled to receive from her master one-half the wages which shall be due to him at each port. A man in a vessel out three months, with say $40 due, can claim $20 upon arrival in a foreign port. Advances and allotments are not favorably regarded by American law. The most recent enactments are in the direction of restricting advance of wages to one month. This will effect the boarding-house keepers, unless they prevail upon masters to evade the law. Defaulting seamen are open to various punishments on arrival home; but corporal punishment at sea is, and ought to be, strictly prohibited. Knuckle-dusters and belaying pins, the boot and the clenched fist, were too often regarded as indispensable adjuncts to discipline and rapidity of motion among sailors in United States ships. The compulsory minimum food scale for United States merchant ships is infinitely more diversified, and considerably more in amount, than the old scale of nearly fifty years ago which held in British ships. The Shipping Federation food scale, agreed upon in London by shipowner, shipmasters, and medical men, is something similar, but is too seldom used in British sailing ships. Every deep-water American ship engaged in the carrying trade is compelled to have a slop chest well in evidence containing everything necessary for a seaman's wear, also a full supply of tobacco and blankets. Not more than 10 per cent. above the reasonable wholesale value of any article is to be charged a seaman. On board United States mail boats not only the officers must be citizens, but also from one-quarter to one-half of the crew. Each such vessel has also to take one American born boy for each 1,000 tons gross register, who must be educated in the duties of seamanship, rank as petty officers, and receive reasonable pay for their services."

In the estimates of requirements of the naval service for the ensuing year recently submitted to the secretary of the navy, Rear Admiral Melville makes estimates for new engineering plants, equipments, tools, buildings, etc., at Norfolk, Port Royal, Port Orchard and Mare island. Admiral Endicott of the bureau of yards and docks will recommend two more large docks on the Atlantic coast. One, according to present plans, is to be built at New York and the other at Norfolk. They will be of granite and concrete, and will accommodate the largest war vessels, and each will cost $1,250,000. It is rumored in Washington that the secretary's recommendation for new ships will be limited to three 6,000-ton protected cruisers to cost in the neighborhood of $1,250,000 each.

SHIPS LOST DURING 1898.

There has just been issued by Lloyd's register of British and Foreign Shipping a report embodying statistics of vessels totally lost or condemned during the year 1898. The report shows that during the year in question the gross reduction in the effective mercantile marine of the world amounted to 1,141 vessels of 820,725 tons, excluding all vessels of less than 100 tons. Of this total, 322 vessels of 463,241 tons were steamers and 819 of 357,484 tons were sailing vessels. As regards steamers, the present return exceeds the average of the preceding seven years by fifty-six vessels and 135,257 tons; as regards sailing vessels it is below the average by thirty-one vessels and 28,551 tons. Similarly, the figures relating to steam tonnage owned in the United Kingdom are above the average, while those relating to sailing vessels are below. The excess in the case of steamers follows upon the great increase during recent years in the amount of steam tonnage afloat, and is partly attributable also to the amount of tonnage broken up, condemned, etc. Apart from cases which come within this latter category, the United Kingdom steam tonnage lost during 1898 exceeds the average of the preceding seven years by about 25,000 tons, while the tonnage owned has increased since 1891 by nearly 2,500,000 tons.

The summary exhibits interesting data as to the relative frequency of the different kinds of casualty, etc., which conclude the existence of vessels. Strandings and kindred casualities which are comprised under the term "wrecked," are much the most prolific cause of disaster. To such casualties are attributable 42 per cent. of the losses of steamers and 47 per cent. of the losses of sailing vessels. The next most frequent termination of a vessel's career is by condemnation, dismantling, etc., about 20 per cent. of the vessels removed from the merchant fleets of the world are accounted for in this manner. Of the remaining causes of loss, collision is the most general for steamers (15 per cent.), and abandonment at sea for sailing vessels (10 per cent.) The percentages just given are based on the present return alone, but the order of frequency of the several classes of casualty appears to be normal. Cases of abandoned, foundered and missing vessels may perhaps be regarded as frequently more or less similar in the circumstances of loss. If these be taken collectively, they comprehend 16 per cent. of the losses of steamers and 24 per cent. of the losses of sailing vessels.

The returns have been compiled by Lloyd's in such a manner as to enable a comparison to be made between the percentages of loss suffered by each of the principal merchant navies in the world. Great as the absolute annual loss of vessels belonging to the United Kingdom appears to be, it is seen to form a very moderate percentage of the mercantile marine of the country, and to compare favorably with the losses sustained by other leading maritime countries. The merchant navies which exceed a total of 1,000,000 tons are those of the United Kingdom, the British colonies, the United States of America, France, Germany and Norway. Of these countries, the United Kingdom shows the smallest percentage of loss, namely, 2.4 per cent. of the vessels owned; the colonies follow with 3.95 per cent.; and Norway is the highest with 7.36 per cent. As regards steamers, while the percentage for the United Kingdom stands at 2.05, the averages of the percentages of loss for the other five countries is 2.58. For sailing vessels, the other five countries show an average percentage of 7.24 as compared with 3.45 per cent. for the United Kingdom.

FOREIGN NAVAL PLANS.

Recent French naval returns show that there are to be completed for commission this year a battleship of 11,275 tons, a third-class cruiser, four torpedo boat destroyers and twenty-five torpedo boats. Great Britain, on the other hand, will commission five battleships, four first-class cruisers, four second-class and six third-class, two sloops and a great number of destroyers. Next year France will complete two battleships and Great Britain four; France, one cruiser, Great Britain, four; France, two gunboats, Great Britain, four; France will have fourteen torpedo boat destroyers but the British list will exceed this.

The German naval authorities have decided to reconstruct the Hagen, a coast-defense vessel built in 1893. She will be lengthened 23 feet, being cut in two a little forward of the mid-ship section. It is claimed that this is the first time that an armored vessel has been so dealt with. The vessel will be utilized for the protection of the Northern Sea-Baltic canal. There are four of these coast-defense vessels and the announcement that the others will likely be lengthened in a similar manner has given rise to the suspicion in British engineering circles that the original design was defective.

The three new battleships recently ordered by the British admiralty will all be launched within eleven months of the keels being laid, but they will be floated without armor. The engines of all three battleships will be given out to contract. They will be of the four-cylinder cruiser type with water tube boilers, to give 18,000 indicated horse power and a speed of 19 knots, the highest yet sought in battleships.

The British admiralty is so well satisfied with the experiments with the Marconi system of wireless telegraphy during the recent naval maneuvres that a complete set of apparatus had been ordered to be fitted on board the Defiance at Davenport, where a series of experiments will be carried out. The admiralty has also called for reports from the commanding officers of the vessels fitted with the wireless system during the maneuvres.

Bids received at the bureau of yards and docks, navy department, for furnishing a locomotive crane for the League island navy yard are as follows: American Hoist & Derrick Co., St. Paul, Minn., $44,950, alternate, $46,900; Brown Hoisting & Conveying Co., Cleveland, $70,000; William Sellers & Co., Inc., Philadelphia, $50,500; Morgan Engineering Co., Alliance, O., $67,379.

Richmond, Va., is going to do itself proud in honor of the launching of the torpedo boat Shubrick at the works of the William R. Trigg Co. in October. A great industrial parade will be a feature of the festivities. The Dale, one of the 30 knot torpedo boat destroyers, is well under way and satisfactory progress is also being made on all the other boats.

SAN FRANCISCO AND THE NICARAGUA CANAL.

During all the discussion regarding advantages to be derived from the proposed Nicaragua canal, it has been generally taken for granted that the construction of a canal at the isthmus would greatly benefit commercial interests of the Pacific coast and of San Francisco in particular. Now that city seems to have suddenly awakened to the fact that there is a possibility of another side to the question. In discussing the matter editorially the Pacific Coast Marine Record says:

"The question as to whether the building of the Nicaragua canal will be a benefit or detriment to the trade of San Francisco is one that has not had its full weight of consideration, and viewing the matter from a conservative standpoint it is well to glance at both sides of the question. San Francisco is today enjoying a reaction in her export trade. Shipments from this port to all portions of the Pacific ocean were never so heavy. Vessels are leaving port each day loaded to their fullest capacity, and ship yards along the American coast are crowded with orders for craft to handle this rapidly increasing industry. Our newly acquired possessions of the Pacific will, sooner or later, be settled by Americans for a business purpose, and these American merchants will look to the home market for their wares, and from a geographical standpoint San Francisco will get the trade or the rehandling of the goods. Our trade with the Hawaiian islands is assuming enormous proportions, while that with the antipodes is large and shows an increase. With Central America and the Mexican coast, the trade is steady and healthy, and the Orient is an excellent outlet for California products.

"What will happen to this trade when the Nicaragua canal is finished and ready for use? Will San Francisco, with her one railroad terminal, be able to offset cargo freights from the Atlantic coast and Europe, direct to the Pacific ocean countries? Vessels will load at New York and go direct to Honolulu much cheaper and nearly as quickly as from New York via San Francisco. England will handle her own colonial trade by the very short route through the canal. The Philippine islands will be handled direct from the Atlantic coast, thus saving railroad freights, and San Francisco will be obliged to content herself with being an import town for goods merely consumed in California. The other side of the question advocates the building of the canal for the purpose of lowering freight rates. It claims that by lowering these, the merchants will be able to land goods here independent of the railroad, and the farmer will be able to ship his products to the eastern market and compete with the European production which is landed in New York at prices lower than the cost of raising in this state. The question arising is: 'Will California lose her foreign trade with the Atlantic coast? If she will, the canal is not what we want, for the loss will be far greater than the gain on the other hand, and at the present time the Pacific coast is doing very well as far as commerce is concerned."

LAUNCH OF THE BUFFALO.

The Western Transit Co.'s steel steamer Buffalo, the largest package freighter on the great lakes, was launched at the yard of the Union Dry Dock Co. at Buffalo last week. In some unaccountable manner the vessel left the ways before the signal was given but she sustained no damage in consequence. The Buffalo is 403 feet over all, 50 feet beam and 28 feet depth. She is constructed to carry 5,700 net tons of freight on a draught of 17½ feet and is guaranteed a continuous speed of 13 miles an hour. There are accommodations for ten passengers in the forward house. The master's quarters are in the texas on top of this house and all of the forward crew are housed under the topgallant forecastle. The engineer, crew and stewards are aft, where also is the dining room and galley. The deck hands and firemen have quarters amidships. The finish in cabins is all hard wood. The steamer is fitted with vertical quadruple expansion engines, having cylinders of 20½, 29¼, 43½ and 63 inches diameter and 42 inches stroke. Steam will be supplied from three boilers of Scotch type, each 12 feet 6 inches in diameter and 11 feet 6 inches in length. Each boiler contains two Morison suspension corrugated furnaces, 46 inches mean diameter, and each has 244 3-inch tubes. The boilers are constructed for a steam pressure of 210 pounds. The vessel, which cost in the neighborhood of $350,000, has a complete electric lighting plant, steam steering gear, windlasses, capstan, two deck engines and steam hoisting gear between decks. She is fitted with Tysack stockless anchors.

RIVER STEAMER OUACHITA.

Capt. E. J. Howard, the Jeffersonville, Ind., steamboat builder, has just completed the handsome steamer Ouachita, building for Capt. L V. Cooley for service on the Black and Ouachita rivers. The new vessel is one of the handsomest excessively light-draught boats on the inland rivers. She is 140 feet in length, 32 feet beam with 2-foot guards, and 3 by 1½ feet depth of hold in the clear. Her draught is 22 inches forward and 18 inches aft. Her height between decks is 15 feet, allowing ample space for the storage of cotton. The vessel is fitted with engines with cylinders 10 inches diameter and 5 feet stroke of piston, with California cut-off, working a waterwheel 15 feet in diameter, carrying 21-foot buckets of 16 inches width. Steam is supplied from a boiler 44 inches in diameter by 28 feet long and with two 12-inch and four 7-inch flues. An innovation in the furnace is an interlining of 1½ inches Magnesia between the fire brick and sheet iron, the top of the boiler and drum being covered with the same material. The equipment includes Worthington fire and feed pumps, and the electric lighting plant is capable of supplying 200 incandescent lamps and three searchlights. The boat is provided with fourteen staterooms.

An elaborate general performance test of the lake freight steamer Pennsylvania, a modern carrier of 6,000 gross tons capacity, quadruple expansion engines and Babcock & Wilcox water tube boilers, is reported in the current number of the Journal of the American Society of Naval Engineers. Lieutenants B. C. Bryan and W. W. White of the United States navy were detailed to investigate for the bureau of steam engineering, navy department, the workings of a mechanical stoker on the Pennsylvania, and in connection with this duty they secured the general performance data.

POWERFUL SALVAGE STEAMER.

Considerable attention has been attracted in European shipping circles to the Herakles, the new wrecking steamer of the Neptune Salvage Co. of Stockholm, Sweden. It will be remembered that this company tried to secure a contract for raising the battleship Maine and the sunken Spanish cruisers at Santiago. The Herakles is believed to be the most powerful and best fitted salvage steamship afloat. Her tonnage is 592, her indicated horse-power 1,600, and she carries a crew of thirty hands all told. Her pumping power is considerable, consisting of one centrifugal pumping engine fixed in the ship, with a pumping capacity of about 3,250 tons of water per hour, two portable centrifugal pumps with portable boiler, each with a capacity of about 1,500 tons per hour, two other portable centrifugal pumps worked by electricity, each also having a capacity of about 1,500 tons per hour, and also one universal steam pump with a capacity of about 500 tons per hour, or a total pumping capacity of approaching 10,000 tons per hour.

The steamship is fitted with electric generator and electric cable of about half a mile in length, these being intended to work the two last-named centrifugal pumps, so that the Herakles can, if necessary, lie half a mile away from the vessel to be assisted and pump her by her own power conveyed by the electric cable, without the use of portable boilers. The Herakles is, in addition, fitted with a full stock of diving apparatus, and she has among her crew well-trained and competent divers. She carries full stores of large hawsers and heavy anchors, together with all appliances for submarine blasting, and everything else necessary for the prompt and efficient conduct of salvage operations. She is also fitted with masthead electric lights for night work. All the crew employed on board have been trained in the company's service, while the firemen have been trained as mechanical workmen to enable them to pass their examinations as engineers; so that in regard to her mechanical appliances and the efficient training of her officers and crew the Herakles is fitted for the conduct of important salvage operations. Captain Grundelius is in command. He has been trained in the company's service for many years, and has been employed on several important salvage operations.

The Neptune Salvage Co. was established in 1870. From that year up to 1897 it had been engaged in over 1,600 successful salvage operations, representing a value in damaged condition of approximating $30,000,000.

THE NEW HILLMAN COMPANY.

The reorganized Hillman Ship & Engine Building Co., which has taken over the old Hillman ship building plant at Philadelphia, has issued a prospectus. Frank Samuel, a prominent iron and steel jobber of Philadelphia, is one of the backers of the enterprise. It is stated that the new company will be incorporated under a Pennsylvania charter with a capital of $750,000 and will own absolutely the yards, machinery, goodwill and in fact everything attaching to the Hillman properties. John Dougherty of New York City, who was formerly with the Wm. Cramp & Sons Ship & Engine Building Co., will be president, and Harry Krominsky, also at one time with the Cramp Co. and later affiliated with the Columbian Iron Works at Baltimore, will be general manager. The yard is to be improved by a new equipment of modern machinery. It is said that new tools for the boiler shop will entail an outlay of at least $65,000. The Hillman property has a frontage of 225 feet on Beach street and a depth of 760 feet. It is announced that the new company will devote itself especially to the building of small craft of all descriptions and to general repair work.

RECORD OF THE IOWA IRON WORKS.

The Iowa Iron Works at Dubuque, Iowa, mention of whose execution of a contract for the construction of five steel tenders for the Mississippi river commission was made in the Review several weeks ago, has recently attracted no small degree of attention in ship building circles. The Iowa works, which now employs more than 250 men, has since its establishment built just half a hundred vessels. One of the more important of these was the torpedo boat Ericsson, constructed for the United States government and delivered on Atlantic waters. The revenue cutter William Windom was built and delivered to the United States government under similar conditions. Another important contract executed by this concern was for the largest self-propelling transfer boat ever built on the inland rivers and which is now in the service of the Southern Pacific Railway Co. at New Orleans. This vessel is 350 feet in length and 93 feet beam, and 740 tons of steel were used in the construction of the hull. The Dubuque yards are now lighted by electricity so that work may be carried on at night.

Major W. H. Bixby, United States engineer at Cincinnati, opened bids a few days ago on 15,000 barrels of natural hydraulic cement for use in the construction of a dam on the Ohio river. There were two bidders, the Cummings Cement Co. of Akron, N. Y., and the National Cement Co., Ltd., of Pittsburg, Pa. The latter company's bid was 93½ per barrel, the cement to be furnished in sacks. The Cummings company's bid was 73½ cents per barrel for the cement in sacks and 87 cents if in barrels. Both bids included the delivery of the cement on board cars.

A denial has just been sent out from the office of the superintendant of public works at Albany, N. Y., of the published statement that $20,000,000 will be required for the completion of the work on the Erie and other New York state canals. It is stated that from this sum there should be deducted the $9,000,000 already expended. The largest proposition yet submitted to the canal advisory board is for the use of $15,000,000, and it is expected that even that estimate will be cut down.

At a dock trial of the battleship Kearsarge at the yard of the Newport News Ship Building & Dry Dock Co., a few days ago, the engines and boilers worked entirely satisfactorily. Work has been commenced at the Newport News yard on the two great ocean liners for the Pacific Mail Steamship Co. The plans have been completed and the keels will be laid within a few days.

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The jury which investigated the accident on the British torpedo boat destroyer Bullfinch, which resulted in the loss of eleven lives, has made the following finding: "That the immediate cause of the deaths of the victims on board the Bullfinch on July 21, 1899, at Spithead, was the breaking of the high-pressure connecting rod of the starboard engine and the consequent breaking of the head of the cylinder, the emission of steam therefrom causing the deaths of the men. There is no precise evidence of the cause of the actual fractures. The jury considers that the rods were not capable of withstanding the great strain of the high speed of 29 or 30 knots. The weakness, emanated both from slightly faulty design, namely, rods weakened by excessive boring, and insufficient metal at the jaw at the point of vertical fracture. Also the evidence of the quality of material is not satisfactory, first, because numbers and marks do not appear on the respective rods, thus losing their identity, and second, for the reason that the material does not appear to be of uniform quality."

Estimates of the requirements of the naval service for the ensuing year, as indicated by the reports submitted by the various bureaus, are far in excess of former years in many respects. The secretary of the navy required that all estimates be in by Sept. 1, in order to insure three months' time for the co-ordination of the reports before it is necessary to submit them to congress. The greatest excess is found under the heading "increase of the navy," where the estimate of $18,000,000 is $5,000,000 more than any previous estimate under this head. The increase is due of course to the great number of warships now under construction.

LUMBER MUST PAY HIGH LAKE FREIGHTS.

The lumber dealer, alike to the shippers who have great quantities of coal, ore and grain to move, is meeting with his share of troubles, on account of the great advance that has taken place in lake freights. He has more reason to view the situation with alarm than any of the other interests, as the tendency is not to build new vessels for the lumber trade, even if they were to be had from the ship yards, but rather to give to this trade a poorer class of old vessels than have been in it in the past; provided, of course, that the demand for lumber does not become so great as to warrant the lumbermen in outbidding other shippers for such vessels as are suited to carrying lumber as well as coal and ore. The feeling among those engaged in the white pine business of the lakes is thus set forth by a correspondent of one of the western lumber journals:

"It is feared at some points that some of the mills will have to shut down for lack of piling room before they cut out their log supply. Some points have been more fortunate than others in this respect and their lumber has been moved forward with reasonable promptness, but for the most part there has been a pronounced shortage of carrying capacity, with the effect above stated. This lumber, to be sure, is not to any large extent the property of the mill man; it has been sold to wholesalers, who are anxious to get it to their yards in order to supply their fall and winter trade. The mills have been kept humming this year and have turned out a larger amount of lumber than usual with a less than usual supply of vessels. Distress is noted in regard to the vessel transportation at all the lake distributing ports and the wholesale trade of the markets is likely to be hampered this fall and winter for lack of material which cannot be gotten away from the docks. There are several causes which have combined to produce this unusual condition. Most of the old vessels that went to the Atlantic seaboard from the lakes last fall were of the lumber-carrier kind, and then again for a number of years there has been little if any replacement of the old vessels which have gone down in storms. The old lumber lugger is fast disappearing and nothing takes its place except of the larger class of vessels which are better adapted to other uses, and which in this season of general commercial activity find a call even more urgent from the iron and coal trades than from lumber, under conditions that are more favorable than with lumber. As a general thing quicker trips can be made with ore or coal and the ships built for these trades are not adapted for lumber; therefore the lumber business has in many cases to take its chances and the chances are against it. It is now being urged that vessels should be built with especial reference to the needs of lumbermen. Perhaps it is too much to expect that this will be done, for the present magnitude of the lumber business on the lakes is not likely to continue many years and so vessels will be built, more so than in the past, for ore, coal, grain and miscellaneous traffic rather than for lumber. Nevertheless, vessels must be had and those which are primarily built with especial adaptation to other uses can be used in carrying lumber if the freight offered is sufficiently attractive, which will probably be the case not only for the balance of the present season but for next year also."

THE MAN ON THE DOCK.

It is a long time since I broke in on readers of the Review with a talk about lake freight matters, or on any other subject in fact, but I could not resist the temptation to tell a story of old times when it was announced, a day or two ago, that the ore rate from the head of Lake Superior had reached an even $2 and that a dollar a ton had been paid on hard coal from Buffalo to Chicago and Milwaukee. That's easy figuring—so many tons of coal, so many dollars, or double the number of tons in dollars on ore. What a disappointment it must be to the ship owners who are tied up to 60-cent ore contracts, and I understand there are few on the lakes, especially among the big owners, who are free of the cheap stuff. A 6,000-ton steamer taking advantage of such freights would be worth almost a gold mine and of the best Klondyke kind at that. It is easy to understand the difference in earnings. Two-dollar ore means $12,000 gross freight per trip, as against only $3,600 at the 60-cent contract rate, or a difference, if figured for the full season, of about $200,000, which is nearly equal to the full value of the best of the big carriers. The $2 rate does not, however, relate to the full season, and anyhow there are so few of the 6,000-ton freighters free of contracts that there is little of reality in any of these figures. But they recall the times when ships were paid for in a single season and when even dollars often ruled in freights. Pard. Smith was a vessel captain of the old days who happened into Milwaukee late in the fall when freights had been booming in all directions, and when the small steamer of 500 or 600 tons capacity was as big a factor in the lake trade as the best of the Rockefeller ships are today. He had such a vessel and she was about the last to leave on a trip down to Buffalo to tie up for the winter. He had a choice of a great many cargoes, but to try to compare them in figures was a great labor to him, and he therefore found great difficulty in making a selection. A cargo of flour, on which freight was then figured at so much per barrel instead of by the ton as at present, appealed to him because of a price that he had fixed before consulting the shipper. Offers of 60 cents and upwards per barrel were all refused, and the flour shipper finally asked that a price be named for the charter, no matter what it might be. "Well," said the captain, "I am not much of a fellow at figures and my mate is no better, but if you will allow that he puts down a chalk mark every time a barrel goes into that hold, and then give me a dollar for every one of them marks, I'll take the flour." Like the vessel owners who are now getting two-dollar ore and dollar coal he wanted easy figuring. The cargo had to go and he got it. Many a pleasant dream is realized in the lake freights now prevailing, but no such dream as that of a dollar a barrel on flour.

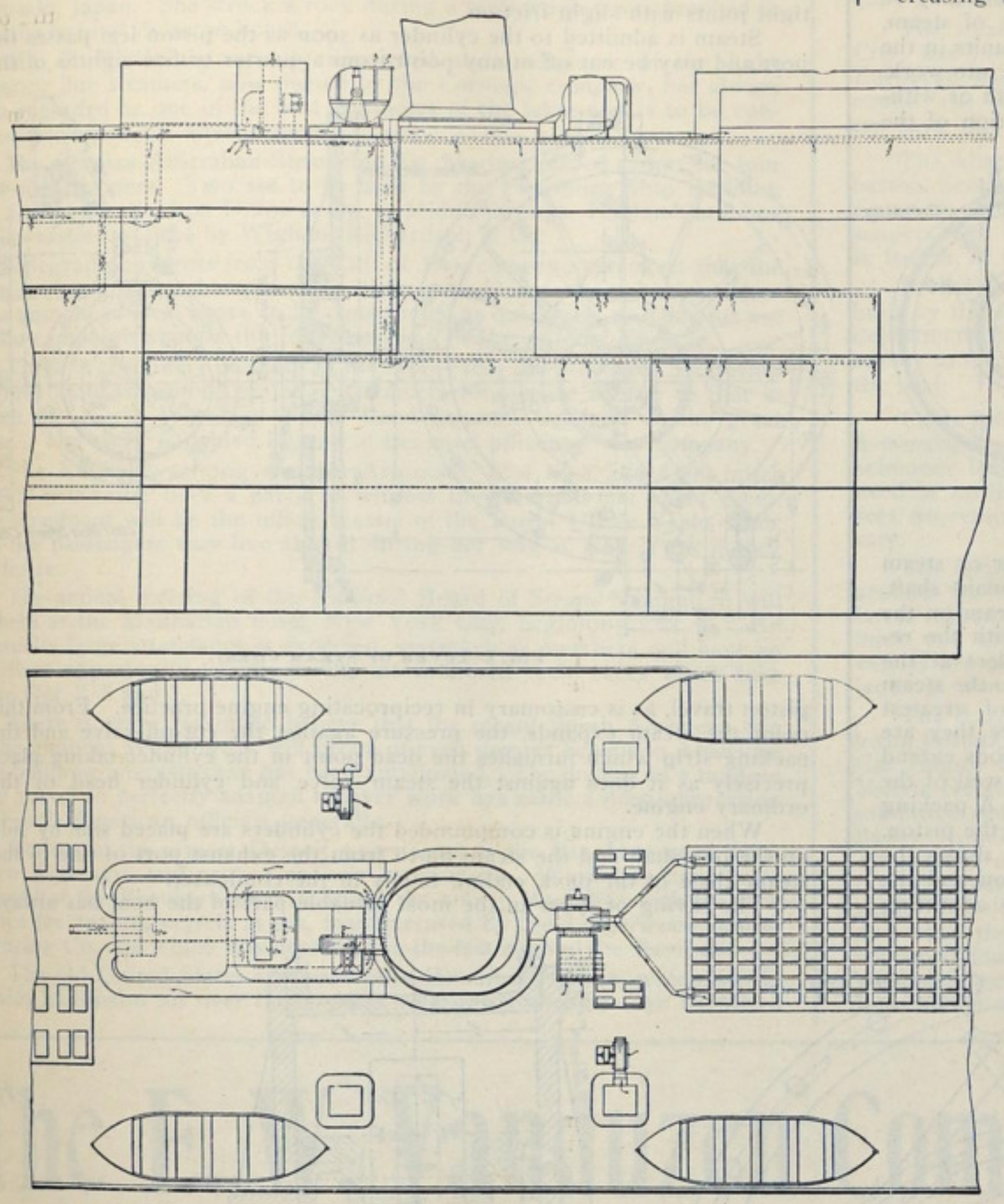
Unless I miss my guess very badly, these high freights will drive the Carnegie Steel Co. into the vessel business before long, and on a very large scale when they do begin operations on that score. It was just such a year as this that caused John D. Rockefeller to play "button" with the ship builders when he let his first contract for ten ore carriers. While it is true that the Rockefeller-Carnegie contract binds the Carnegie company, or rather the Oliver Mining Co., which is practically the same interest, to furnish for transportation to the Rockefeller ships a large amount of ore, it is well understood, of course, that this does not mean all the Lake Superior ore—more than 4,000,000 tons annually—now controlled by the Carnegie company. The Carnegie ore on which the Bessemer Steamship Co. (Rockefeller ships) has the call, is in fact probably not more than half of the total output of Carnegie mines. With this point in view, it will readily be seen that while the other big steel manufacturing combines, like the Federal, National and American Steel & Wire, have been fortifying themselves by the purchase of ships as well as mines, the Carnegie company has, aside from its contract with Rockefeller for the transportation of a part of its ore, only a few small steel vessels, secured recently through the purchase of the Lake Superior Iron Co., and is therefore dependent upon individual vessel owners, now growing fewer in number from day to day, for the movement of a very large part of its ore. The Carnegie company is in fact dependent upon the small fleet of ships now owned by individual vessel owners to a greater extent than any of the other big steel companies. Is it not reasonable, then, to expect from this company, which has a very difficult problem to meet for next year, a move towards the ownership of vessels? Ships of the kind they would want can neither be bought nor built for next year, and it is a question whether they could, if they desired it, secure the construction of an adequate fleet in lake yards for the spring of 1901, unless they should make immediate arrangements to furnish the material themselves. But they could, if they thought it good policy to do so, readily equip a ship yard on their own account and provide machinery so as to get out a few vessels late next year. It is a wonder that they have not entered into an undertaking of this kind, in view of the large sums that will be involved in their expenditures on account of lake freight next season. How nicely they would have had this matter in hand if they had purchased the Wheeler ship yard at West Bay City when it could have been secured at a low figure before it was taken over by the lake ship yard consolidation.

James McBrier of Erie, has been very fortunate during the past two seasons in having operated his vessels on the chances of wild rates, in preference to the acceptance of low-rate ore contracts, but his charter of the steamers Uganda and Tampa to Crerar, Clinch & Co. of Chicago, for the balance of the present season, and the entire season of 1900, at $95,000 is not, I understand, generally looked upon by vesselmen as the cream of what is now going in the charter line. Vessels of this kind have been chartered for the balance of the present season at what would mean about $25,000 each for the Uganda and Tampa, so that for the use of the two of them during all of next season Mr. McBrier and his associates (Mr. E. D. Carter of Erie, is the principal owner with him in the Tampa) get only $45,000. It is understood, however, that the charterers pay insurance on the Uganda next season, and on the Tampa for the balance of the present season, as well as the full season of 1900. Then, too, Messrs. McBrier and Carter purchased the Tampa only a short time ago from the underwriters at $55,000, with a guarantee of the best wooden-ship rating for her after repairs at West Bay City are finished, which will be in a few days now, and they probably figured that on this basis the charter was one that could not on sound business principles be refused, as it will net them, during the first fifteen months of their ownership of the Tampa, $45,000 for that vessel, or within $10,000 of what they paid for her.

The Anchor line steamer City of Rome on her last trip from Glasgow ran into an iceberg, but backed away without damage. The weather was foggy and the ship was going at only two knots' speed when the iceberg loomed ahead. Orders were given to reverse the engines but the effort to slow down was ineffectual and the impact was teriffic.

VENTILATION AND HEATING OF STEAMSHIPS.

While efforts are continually being made by all the great steamship companies, notably those that compete for the travel between Europe and America, to improve their ships, reduce their time of passage, and to make comfortable the passengers, no expense being spared in decorations and luxurious fittings of the saloons and rooms which are the temporary home of travellers, it is a pleasure to be able to record the fact that the matter of ventilation is also receiving its share of attention.



FIGS. 1 AND 2. STEAMSHIPS ST. PAUL AND ST. LOUIS.

There is no doubt that one of the greatest defects in a modern steamship has been the failure to provide an adequate and constant supply of pure air at all times and in all parts of the ship that are occupied by passengers and crew. Much of the discomfort on shipboard, including seasickness, arises from the bad air which everyone is obliged to breathe when below decks with the air ports closed, especially in rough weather. The remedy is simple, effectual and inexpensive. By means of a fan the

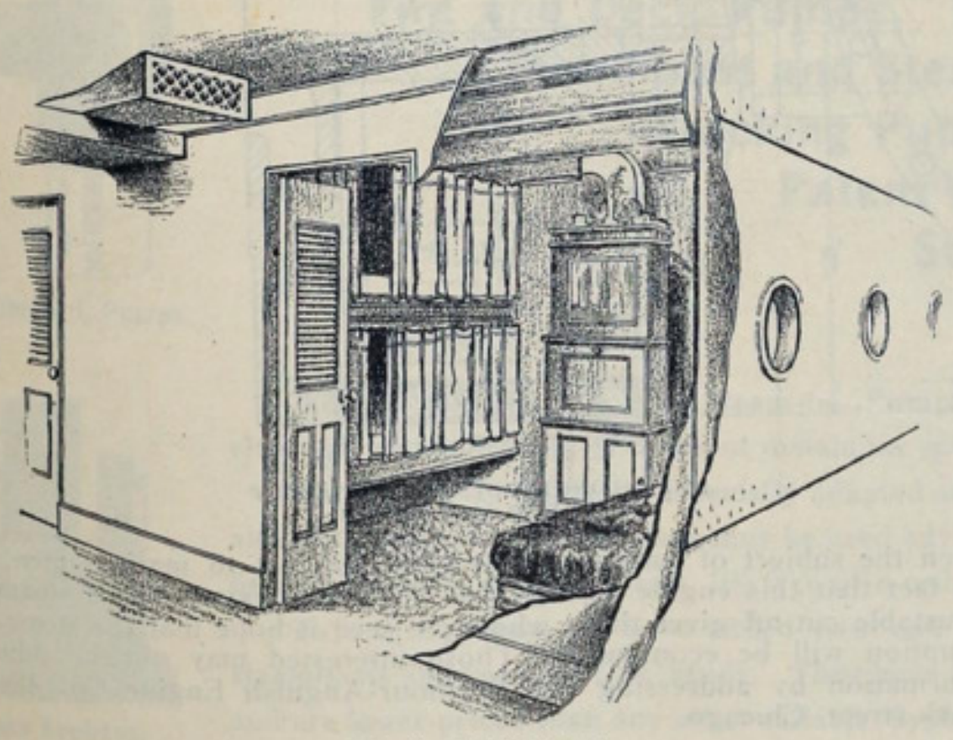


FIG. 3. STATEROOM.

staterooms and saloons can be given the freshness of the outer air, instead of the stuffy and oppressive atmosphere that now characterizes them.

....

The problem is of equal importance in naval vessels, and the course of its inception and successful solution in the American navy has had a great influence in leading the merchant marine to adopt this most beneficent improvement. In March, 1878, the secretary of the navy appointed a board of officers "to examine and ascertain the best system of ventilation, by mechanical means or otherwise, by which the ships of the navy may be more perfectly ventilated than at the present time." This board made an examination of the U. S. S. Richmond, and reported: First, upon the necessity of ventilation, showing "the filthy condition of the atmosphere generally on shipboard, which both men and officers are compelled to breathe; thus inducing disease, impairing health and increasing the mortality." Second, upon the necessity of some mechanical devite to keep up the circulation of air, giving reasons why "no system of ventilation can be relied upon which depends for action on induced currents produced by the differences of densities or the difference in the static and dynamic heads of the internal and external air." As a mechanical device for ventilating, it was recommended "that a fan of the most improved type, and one that has been thoroughly tested and found efficient be adopted." Two fans, the first constructed for this purpose, were built by B. F. Sturtevant. After twenty-five days at sea, Chief Engineer Baker wrote: "It may be confidently stated, that the Richmond is now by far the most completely ventilated ship that ever sailed under the American flag, or, indeed, under any flag."

The International Navigation Co.'s magnificent transatlantic liners, St. Louis and St. Paul, undoubtedly stand today as the most perfectly heated and ventilated vessels afloat. All other means of heating were discarded on these vessels, and the Sturtevant system adopted throughout. The system is duplex in its operation, one series of fans, with their attached heaters, serving to furnish pure warm air to practically all occupied portions of the ships, while a separate set of exhausting fans is arranged to withdraw the air, and to thereby compel its complete circulation. The presence of water-tight bulkheads naturally prevented the horizontal extension of air pipes throughout the lower decks. Four separate plants were therefore introduced, each plant consisting of a heating and an exhausting apparatus, both located on the shade deck, and driven by direct-connected electric motors. From each of these apparatus pipes extend downward, and upon each deck connect with horizontal systems; no pipes passing through the transverse bulkheads. The general scheme of this arrangement is indicated in Figs. 1 and 2, showing, in outline, a longitudinal section and plan of the shade deck which embraces one of these systems. Smaller auxiliary fans, one shown on either side of the ship, supply fresh, cool air direct to the engine rooms, while the large fan, presented in side elevation, is devoted solely to exhausting from the galley. All pipes are carried close up to the deck or deck beams above. On the berth deck the supply ducts are extended down each of the stateroom alcoves, discharging the air overhead toward the side of the ship, as indicated in Fig. 3. Positive circulation throughout the stateroom is accomplished by extending an exhaust pipe down behind the commode and dressing case, as shown, and providing it at the bottom with a suitable opening. The latticed panel permits of ready passage of air when the door is closed.—From B. F. Sturtevant Co.'s Treatise on Ventilation and Heating.

The United States cruiser Brooklyn now carries on her davits a new racing cutter, purchased by the crew of the vessel after a failure to induce the government to purchase for them one equal to that on the cruiser New York.

WILL THE NORTHWEST GRAIN CROP BE MOVED?

Duluth, Minn., Sept. 6—Notwithstanding the 6-cent freight now being paid for spot loading of wheat for Buffalo, there is under charter for September loading vessel capacity to the extent of fully 2,500,000 bushels, with the freight on the bulk of this grain at about 3½ cents. This represents, of course, charters made some time ago. Vessels owned by a large steel corporation are under charter to carry 1,500,000 bushels of this wheat.

Capt. Alex McDougall, who is in vessel brokerage business here, says: "The crop of that part of the northwest directly tributary to this port is now practically secured, and is beginning to come in fast. From the Canadian northwest, which materially affects the rates from this port, come advices of particularly good crops. The great question with the grain men in this section is, how will they manage to move their grain this fall? Wheat could probably be carried by rail from Minneapolis eastward after the lake rate exceeds six cents from Duluth. Six cents might be the limit on lake freights were it not for the fact that the railroads from Minneapolis would become congested and find themselves utterly unable to carry the large yield, especially in view of the general prosperity that now prevails in all lines of trade. All products that make a ton of iron, including the labor, are so cheap, compared with the price of manufactured iron and steel, that the margin of profit in iron and steel lines is very great, and it is therefore hard to predict how high the iron men will lead or follow the grain freights. It would seem that millions of tons of commodities of all kinds will be carried over, for the movement of which vessel tonnage cannot be secured. Under these circumstances, the vessel agent at this end of the route is placed in a peculiar position. If he is a bull, the shipper is afraid of him. If he charters vessels ahead, the owner may censure him for not getting a rate as high as that prevailing on the ship's arrival. It would seem, therefore, that as the turning or quitting point is largely with the ore shippers, and as the vessel owners at Cleveland and other lower-lake points are closer to the ore interests than we are here, they should be the better judges as to the limit the grain must pay for lake transportation."

The plant of the Wm. Cramp & Sons Co. at Philadelphia will not be in operation for ten days, owing to the encampment of the Grand Army of the Republic. The ship yard will, however, be open to the inspection of visitors from 10 o'clock in the morning until 3 o'clock in the afternoon each day.

SEYMOUR TURBINE ENGINE.

We present herewith sectional and plan views of a new turbine engine that is exciting considerable interest in marine circles, owing to the fact that an experimental engine is being used in the launch Ziyara, which is making daily trips on the lake and river at Chicago, exhibiting the engine to engineers, investors and mechanical experts.

The engine consists of a number of independent cylindrical units, mounted side-by-side on the main shaft, and the number of units may be varied according to circumstances and the available pressure of steam, being varied, of course, according to the total number of heat units in the steam and the number of steps necessary to transform the heat into work. It may consist of one, two, three or four cylinders and run with or without a condenser, as may be desirable. Fig. 1 is a cross section of the

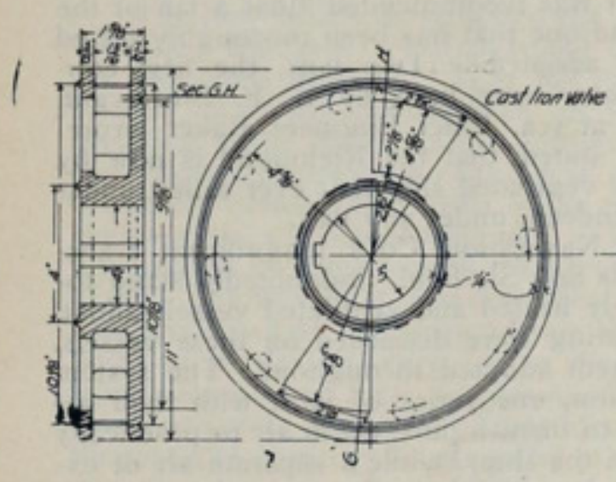


FIG. 4—VALVE, CUT-OFF AND STEAM CHEST.

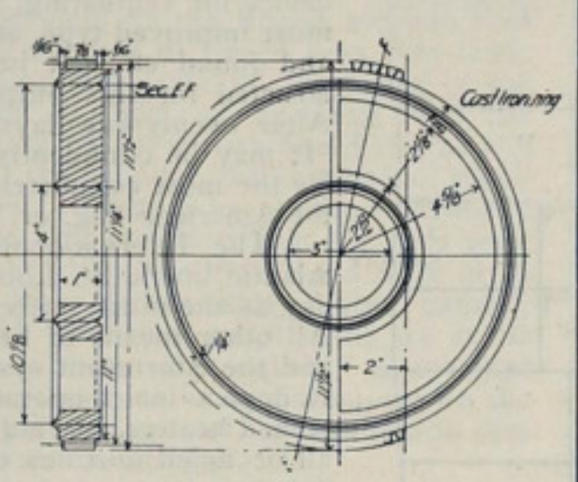


FIG. 5.

cylinder through the center line, showing the outer cylinder or steam chamber, the revolving piston head, which is keyed on the main shaft, and two sliding pistons, which are held in place by a circular cam on the cylinder heads, concentric with the cylinder, and eccentric with the revolving piston on the main shaft. This cam, pressing on rollers at the bottoms of the pistons, throws the pistons out as they pass into the steam chamber and allows them to recede as they pass the point of greatest expansion until they reach the bottom of the cylinder, where they are almost wholly within the revolving piston. Two connecting rods extend from the upper corners of the pistons' leaves to points on the wall of the piston and prevent any cramping of the leaves in their slides. A packing strip at the bottom of the cylinder prevents steam leading past the piston.

Fig. 2 is a longitudinal section of the same cylinder and shows the cams on the interior wall of the cylinder, the revolving piston and the steam entry and exhaust ports. There are two steam ports admitting steam either side of the packing strip in the cylinder, and two exhaust ports, one on each side of the cylinder wall, so that the engine may run either way, all that is necessary being to open one set of ports and close the other. Piston leaves and walls are suitably packed with metal packing in the usual manner of making steam-tight joints in engine cylinders.

Fig. 3 shows the circular cover of the steam chest, which is bolted on the cylinder head to cover the steam ports and provided with packing box in the center, so that the main shaft may pass through it.

Figs. 4 and 5 show the rotary cut-off valve, which is mounted on the main shaft, and the adjustable ring or sleeve, which lies between the cut-off and the steam ports of the engine. This latter is stationary and loose upon the main shaft. Teeth are cut in its outer edge, which mesh with a spur pinion that serves to rotate it on the shaft and thus open or close the steam entry port as desired. As this ring is used to open and close both steam ports, a circular slot is cut for one-half its diameter and a stop R, Fig. 3, which fits the slot, is screwed to the upper inner edge of each steam port. When either edge of the cut-off ring lies against one of these stops, that port is entirely closed and the openings of the rotary valve passing behind it will have no effect. The size of the steam admission port depends upon the position of this cut-off ring, and the steam admission is therefore entirely adjustable. Both surfaces of the rotary valve and cut-off ring are provided with V packing rings, which make steam-tight joints with slight friction.

Steam is admitted to the cylinder as soon as the piston leaf passes the port and may be cut off at any point from a quarter to five-eighths of the

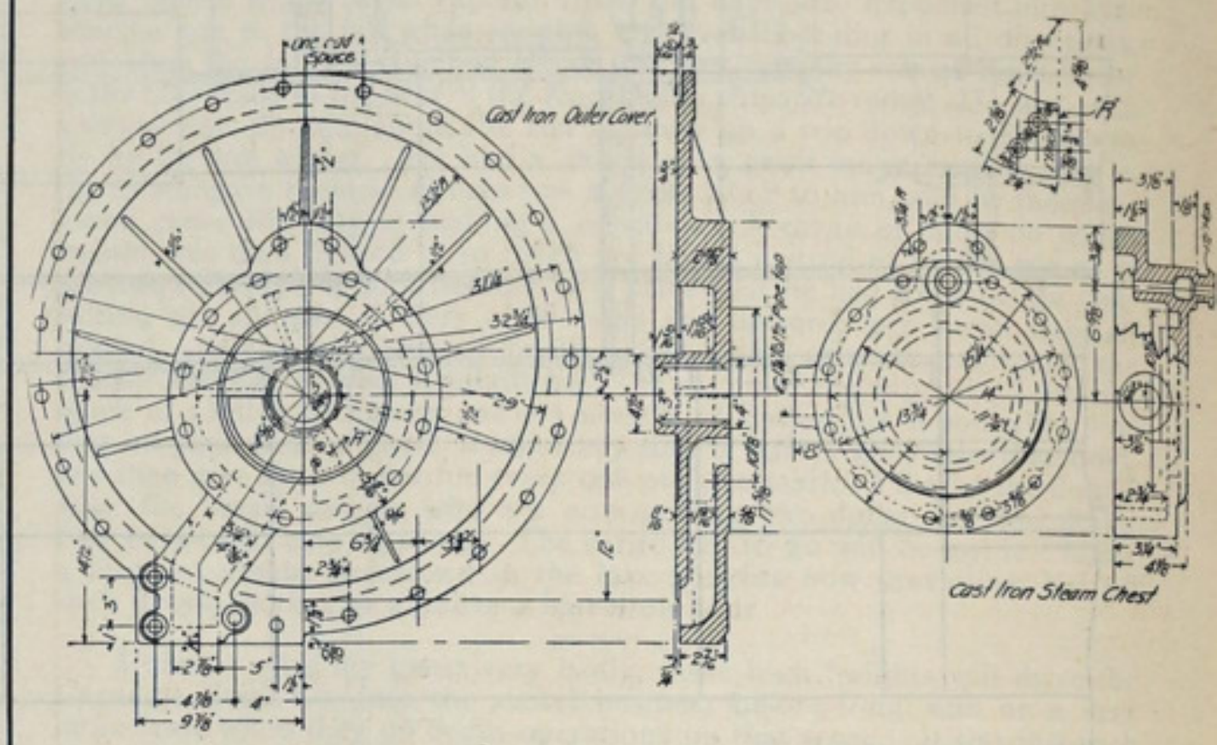


FIG. 3—COVER OF STEAM CHEST.

piston travel, as is customary in reciprocating engine practice. From this point the steam expands, the pressure against the cut-off-valve and the packing strip which furnishes the dead point in the cylinder taking place precisely as it does against the steam valve and cylinder head of the ordinary engine.

When the engine is compounded the cylinders are placed side by side on the one shaft and the steam piped from the exhaust port of one to the steam chest of the next, ending finally in the condenser.

The saving of space in the most valuable part of the boat has always given the subject of rotary engines great interest to marine men, and the fact that this engine actually has a positive expansion of steam and adjustable cut-off gives those who have seen it hope that the steam consumption will be economical. Those interested may obtain additional information by addressing the Seymour-Anguish Engine Co., 4800 N. Clark street, Chicago.

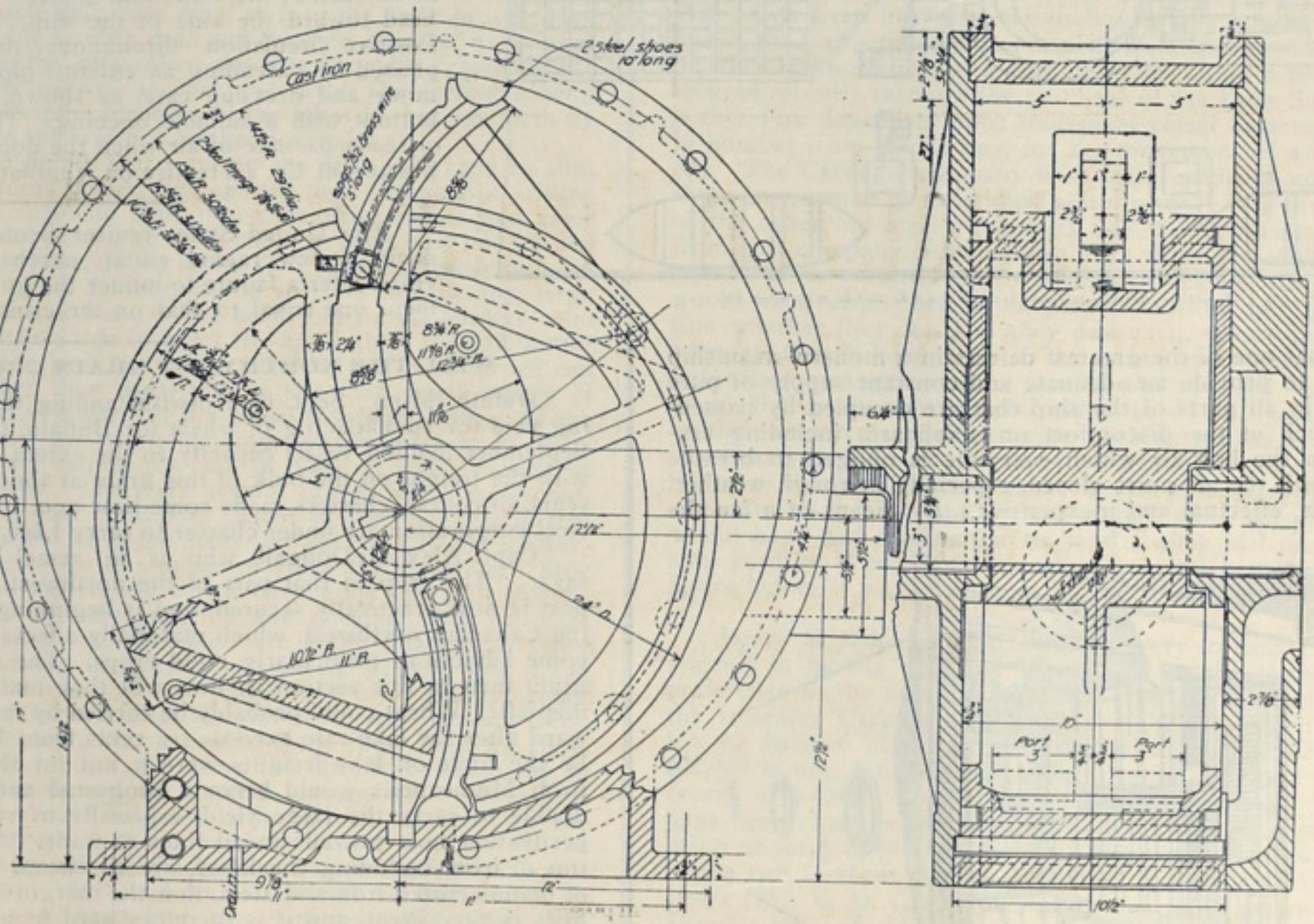


FIG. 1—SEYMOUR ROTARY ENGINE-SECTION.

FIG 2—LONGITUDINAL SECTION OF CYLINDER AND PISTON.

A few weeks is now given as the limit of time for the opening of the new steamship line to be conducted jointly by the Horsley Steamship Co. of Great Britain, the Mobile & Ohio and Southern railway companies, and the Mobile Steamship & Terminal Co. Vessels will ply between New York, Mobile, and the principal ports in the West Indies, Central and South America and Europe. The Horsley company will provide the vessels.

ITEMS OF INTEREST.

A recent cruise of the coast survey steamer Endeavor through Long Island Sound will result, it is understood, in a revision of the coast pilot.

Milwaukee contractors have been asked to make estimates upon the cost of building a canal and lock for the Oconomowoc Waterways Co. near Oconomowoc lake, Wis.

The United States army transport Morgan City is ashore near Nagasaki, Japan. She struck a rock during a typhoon and was beached to save the lives of those on board.

Mr. F. B. Smith, recently appointed shore engineer of the Lake Superior line steamers, now owned by the Carnegie company, has always been regarded as one of the best engineers of the lakes and is to be congratulated upon his advancement.

The German-Australian Steamship Co. has just placed orders for four 6,500-ton steamers. Two are to be built by the Flensburg Ship Building Co., one by Sir Raylton Dixon & Co. at Middlesbrough, England, and one at Newcastle-on-Tyne by Wigham Richardson & Co.

Telegraphic reports from the City of Mexico are to the effect that the Mexican government has placed an order with New Orleans boat builders for a number of steel boats, to be constructed as quickly as possible for use in the campaign against the Maya Indians in the state of Yucatan.

There is absolutely no truth in the report that the Northern Steamship Co. will build two more passenger steamers for service similar to that in which the North West and North Land are now engaged on the great lakes. The story is denied by one of the chief officers of the company.

The English yachting steamer Argonaut, 3254 tons and 4,000 horse power, will bring over a party to witness the international yacht races. The Argonaut will be the official vessel of the Royal Ulster Yacht Club, and her passengers may live aboard during her stay at New York if they so desire.

The annual meeting of the National Board of Steam Navigation will be held at the Manhattan hotel, New York City, beginning Oct. 4. An unusually large attendance is expected, inasmuch as members will have an excellent opportunity to witness the international yacht races which take place Oct. 3, 5 and 7.

There is every reason to believe that the recent South American trip of the gunboat Wilmington will prove of even greater benefit to American ship building interests than has been anticipated. The display of a modern steel vessel so perfectly adapted to river work has made a deep impression on South American officials generally.

Boilers of the cruiser Detroit were tested at the Brooklyn navy yard, a few days ago, and proved entirely satisfactory. Work has been commenced at the Brooklyn yard in fitting the collier Marcellus with the new device for coaling vessels at sea, manufactured by the Lidgerwood Manufacturing Co. and which was described in the last issue of the Review.

The old United States revenue cutter Hannibal Hamlin, which was in service at Boston for over thirty years, was sold a few days ago to Alfred Wilson of that city for $321. The vessel, which was built in 1866 and registers 65 tons, when put up at public auction some months ago brought no offer above $251, and this bid the government refused to accept.

When the White Star liner Oceanic was thrown open to the public for inspection before her departure from Belfast, a small charge was made for admission and the proceeds given to a local hospital. Inasmuch as more than 10,000 persons visited the ship it will readily be appreciated that quite a handsome sum was netted for the charity.

The steam yacht Varuna, owned by Eugene Higgins of New York City, has just returned to her home port after an extended cruise in European waters. From Havre to New York the yacht took a southerly course, the voyage covering 3,280 miles, which was covered in less than ten days, the vessel averaging 14 knots an hour for the trip.

The Allan line has just placed an order with Denny Brothers of Dumbarton, Scotland, for a new 10,200-ton steamer. She is to be fitted with accommodations for 160 first-class, 130 second-class and 200 third-class passengers, and will be employed in the Canadian trade. She will be 520 feet in length, 59 feet beam and 43 feet depth.

Preliminary to the official speed trial of the torpedo boat Stringham, built by the Harlan & Hollingsworth Co. of Wilmington, Del., the navy department has requested the superintendent of the coast and geodetic survey to measure off a mile course in Chesapeake bay, for the purposes of the trial. The trial will probably take place within a few weeks.

Capt. John G. Crowley of Taunton, Mass., managing owner of the five-masted schooner John B. Prescott, and who now has a six-masted schooner building at the Bean yard at Camden, Me., claims that there need be no limit save draught to the building of large schooners and he sees no reason why a fifteen-masted vessel should not be built if necessary.

The laying of wagers on the time made by sailing vessels in voyages around the continent is becoming of quite common occurrence. The latest reported is a wager of $10,000 on a race between the Tillie E. Starbuck and the St. Francis from Philadelphia to San Francisco. Both vessels are owned in New York, the former being built of iron and the latter of wood.

The scarcity of steel and the difficulty in securing prompt delivery is being brought home to the navy department with greater force daily. The Gas Engine & Power Co. and Chas. L. Seabury & Co., Consolidated, of Morris Heights, N. Y., assigns this difficulty as the cause for its recently submitted request for more time for the completion of the torpedo boat Bailey. Similar requests have also been received from other ship builders. The bureau of yards and docks had a significant experience in securing the construction of a workshop for ordnance at the League island navy yard. The original specifications called for the use of considerable steel, and when the bids were submitted all were found to be in excess of the appropriation. Modifications of the plans were made and bids again invited, but meanwhile the price of steel had again advanced and the bids were higher than originallly.

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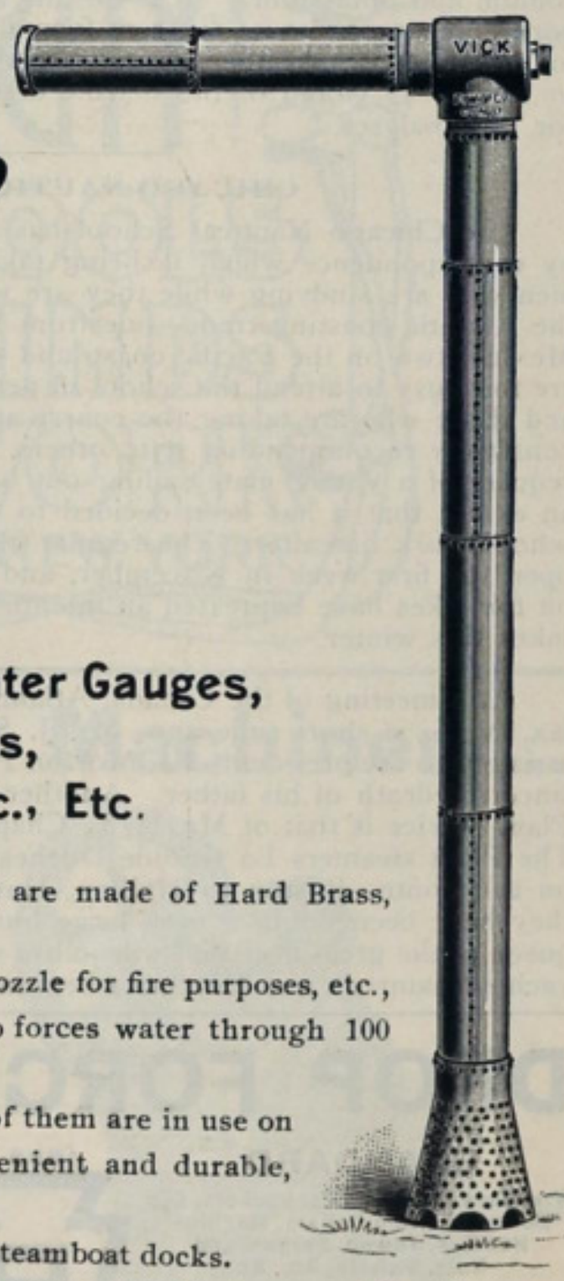

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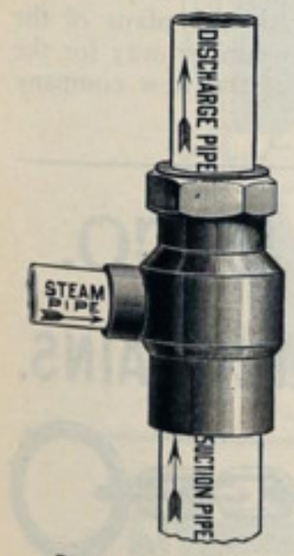

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SOLIDS IN DIFFERENT WATERS.

The pure water of Lake Superior, the greatest body of fresh water in the world, contains less solid matter than the water of any other lake in the great lakes system. Mineral analyses of all the waters of the great lakes show that under ordinary conditions there is but a little more than 2 grains of solids in a gallon of Lake Superior water, as against 6½ to 8 grains in the waters of the other lakes. A comparison in this respect will be found in the following table, prepared from reports of chemists connected with the Dearborn Drug & Chemical Works of Chicago:

MINERAL ANALYSIS, WATERS OF THE GREAT LAKES PER UNITED STATES WINE GALLON OF 231 CUBIC INCHES.

	Lake Michigan	Lake Huron	Lake Erie	Lake Superior	Lake Ontario
Silica	.3504	.467	.3854	.175	.537
Oxide of iron and aluminum	.....	.099	None	.029	.012
Carbonate of lime	3.5003	3.533	2.7833	.905	5.472
Carbonate of magnesia	1.1679	1.217	1.2520	.243	1.679
Sulphate of lime	1.5936	Trace	.9960	Trace	.....
Sodium and potassium chlorides	1.0327	.670	.9000	.340	.166
Sodium and potassium carbonates	.1571	1.022	.1073	.644	.294
	7.8020	7.008	6.4240	2.336	8.160
Organic matter	1.0512	Trace	.....	Trace	.....

The Chicago company is engaged in manufacturing boiler compounds, and its practice is to prepare the compound for the kind of feed water that is used. As this company's product is in use in all parts of the world, its analytical department makes a specialty of water analyses and has a vast amount of information on that score. It will be interesting to compare a summary of solids in the salt water of the Atlantic with the foregoing table regarding lake waters. The sample to which the following table relates was taken in latitude 43′ 01° N. and longitude 44′ 19° W. in June last by John Hunter of Whitehall, N. Y., chief engineer of the American line steamer St. Paul:

MINERAL ANALYSIS, SEA WATER—TAKEN ON THE ATLANTIC IN LATITUDE 43′ 01° N. AND LONGITUDE 44′ 19° W.

Silica, (Si 02)	.584	grains per gallon.
Oxides of iron and aluminia	1.402	" "
Carbonate of lime	7.523	" "
Sulphate of lime	68.080	" "
Sulphate of magnesia	80.758	" "
Chloride of magnesia	240.750	" "
Sulphates of sodium and potassium	54.433	" "
Chlorides of sodium and potassium	1742.785	" "
Loss and not determined	4.781	" "
	2201.096	

It will be noted that the sea water contains per gallon a trifle over 2,201 grains of solid matter, of which 1,743 grains is salt (chlorides of sodium and potassium). It is on this kind of information that the Dearborn company bases its different formulas in the case of sea-going boilers, for instance, to take the place of metallic zinc. The Review is indebted to Mr. E. P. Gould of the marine department of the Chicago company for the analyses.

CHICAGO NAUTICAL SCHOOL.

The Chicago Nautical School has opened a course of nautical study by correspondence which is being taken advantage of by a number of men who are studying while they are working. Six of these men are in the Atlantic coasting trade—one from Havana, Cuba, one on the Gulf of Mexico, two on the Pacific coast, and several who hail from Chicago but are too busy to attend the school in person. The list is rapidly growing, and those who are taking the course are so pleased with it that they are constantly recommending it to others. This course was taken up at the request of a young mate sailing out of Boston, and has spread to such an extent that it has been decided to make it a regular feature of the school work hereafter. The regular classes for personal attendance will open the first week in November, and a large number of the men now on the lakes have expressed an intention to take the course for the great lakes this winter.

At a meeting of the Canada, Atlantic & Plant Steamship Co. at Halifax, N. S., a short time ago, Mr. J. Stewart Thomson was appointed assistant to the president, Mr. Morton Plant, who has taken the presidency since the death of his father. Another appointment in this branch of the Plant service is that of Mr. H. L. Chapman as superintendent at Halifax. The Plant steamers La Grande Duchesse and Halifax have been running on this route—Boston to Halifax, Hawkesbury and Charlottetown—and they have been doing a very large business. The Duchesse will be the queen of the great fleet that will follow the international races between the yachts Shamrock and Columbia beginning Oct. 3.

TRADE NOTES.

The Stilwell-Bierce & Smith-Vaile Co. of Dayton, O., announces that it has established a branch office at St. Louis, Mo., in the Burlington Building, with Mr. Louis Bendit as manager. The St. Louis branch will carry in stock air compressors, pumps for all purposes, condensers, filter presses, Victor turbin water wheels and refrigerating machinery.

One of the most important problems presented in the equipment of the repair ship Vulcan, of the United States navy, described in a recent issue of the Engineering Magazine, was that of maintaining an endurable atmosphere in the forge shop and foundry, which were located between decks. The problem was solved by introducing a large steam fan and system of piping. This installation, like that in connection with the foundry equipment, was made by the B. F. Sturtevant Co. of Boston. The fan was applied to exhaust the smoke from the forge hoods, and coincidentally the hot air from the forge shop. It was stated by the officers in charge that "this arrangement proved of inestimable value."

The Union Mfg. Co., New Britain, Conn., is now occupying a part of the recent important addition to its factory. The new building is of brick and is three stories high, 90 by 36 feet, and is directly connected with the original plant. When fully equipped it will double the company's present capacity. This company have recently obtained a patent for an attachment to the Union drill chuck, which gives it a positive drive, a feature which will be appreciated by mechanics, especially on the larger size chucks. They have also recently put on the market a special valve chuck equipped with ball bearings, which is made in the usual sizes. This chuck is said to operate with less friction, and to be a great improvement over any similar chuck on the market. A lot of this style have been ordered for the Brooklyn navy yard.

One of the officers of the Chicago Pneumatic Tool Co., Monadnock building, Chicago, says: "The best indication that we have of the constantly growing favor with which pneumatic tools are received by railroads, ship yards and manufacturers generally, is the fact that our sales of these tools for August, 1899, have been equal in volume to our total sales for the year 1897. There is hardly a branch of metal working today, but what has found it desirable to adopt the use of pneumatic appliances, and in plants where they started with a small outfit, the number of tools in use has been largely increased. Every month our trade in these tools has shown an increase over the preceding month, indicating that pneumatic tools have passed the experimental stage and are everywhere recognized as great labor savers. There is not a railroad shop of any importance in the United States where our tools cannot be found in successful operation, and the constant additions being made to such equipments show clearly that the officials in charge recognize their merits. It is understood the world over that Americans are always first to perfect and adopt labor saving appliances, and among such appliances pneumatic tools have reached the front rank. The demand for these appliances in all branches of metal work has impelled us to bring out new tools from time to time, until we now have them adapted to every requirement."

FIRE AT THE MILLS DRY DOCK.

The plant of the Mills Dry Dock Co. at Buffalo was visited during the past week by a disastrous fire, which entailed a loss estimated at $100,000, not including the damage done to the wooden steamers George Spencer and Ionia, which were in adjoining dry docks. Fire broke out in the wooden building used as a woodworking plant, engine and pump house. The steamer Spencer was damaged to the extent of $5,000 and was saved from total destruction only with the greatest difficulty.

It is not probable that the fire will interfere with the plans of the syndicate of lake vessel owners and underwriters now under way for the purchase of the Mills' plant, as it was the intention of the new company to undertake extensive improvements.

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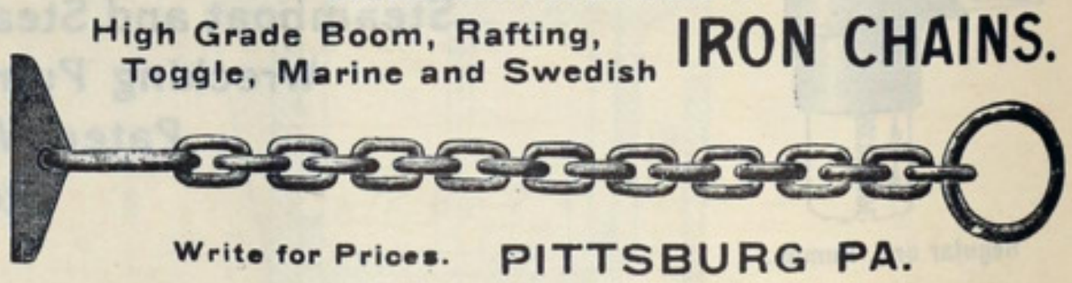
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VALUE OF STOCKS—LEADING IRON AND STEEL INDUSTRIALS.

Quotations furnished by HERBERT WRIGHT & Co., Cleveland, date of September 6, 1899.

NAME OF STOCK.	OPEN	HIGH	LOW	CLOSE
American Steel & Wire	58	58½	57¾	57¾
American Steel & Wire, Pfd	99	99½	99	99½
Federal Steel	61¾	62⅞	61¼	61¼
Federal Steel, Pfd	82¾	83⅛	82½	82½
National Steel	56½	56⅞	56½	56½
National Steel, Pfd	98	98⅞	98	98½
American Tin Plate	43	43¼	43	43
American Tin Plate, Pfd	.....	.....	.....	.....
American Steel Hoop	38½	38⅞	38⅛	38¼
American Steel Hoop, Pfd	84½	85	84½	85
Republic Iron & Steel	32½	33⅞	30¾	31¾
Republic Iron & Steel, Pfd	78¾	78⅞	78	78¼

IMPORTS OF IRON AND STEEL.

Referring to importations in iron and steel lines, due to the unprecedented demand for this material everywhere in the United States, the Iron Age of New York says:

"Importers have had a number of inquiries for material. Some foreign ore has been purchased, and it looks as though some business might be done in steel billets. There has been considerable talk also of importing steel plates, and English advices continue to refer to lots of 10,000 tons and upwards. We have been quite unable to trace any such quantities, the largest single lot bought during the last month being one of about 1000 tons, in order to secure prompt delivery, when the American mills could not promise it. As a matter of fact, aside from prices, it turns out that foreign makers can rarely promise better time than the domestic mills, and it is only when it is to be used for export work under the drawback system that foreign material has much of a chance. American manufacturers will generally study this phase more thoroughly than heretofore. We understand that in tin plate there have been considerable purchases on this account lately."

DEVICE FOR HANDLING BARREL FREIGHT.

Mr. H. P. Patriarche, dock agent for the Flint & Pere Marquette Railroad Co. at Milwaukee, and who has had an experience of ten years or more in the handling of all kinds of freights, especially flour, to and from ships, docks and cars, has acquired patent rights on a "sling frame," a device that weighs only six pounds and which enables one man to handle four hooks as rapidly as two men can in the old way. It is of especial use in "hoisting in" and "striking down" barrel cargoes. It is claimed that although these frames can be made for about $12 a dozen and would sell at $75, one of them would pay for itself in twenty-five hours' work. The new device does away with one man on each side of a hatch, or wherever the hooks are used. In unloading or loading, the frame does not interfere at all, and anything can be done with the hooks when the frame is in use that can be done without it.

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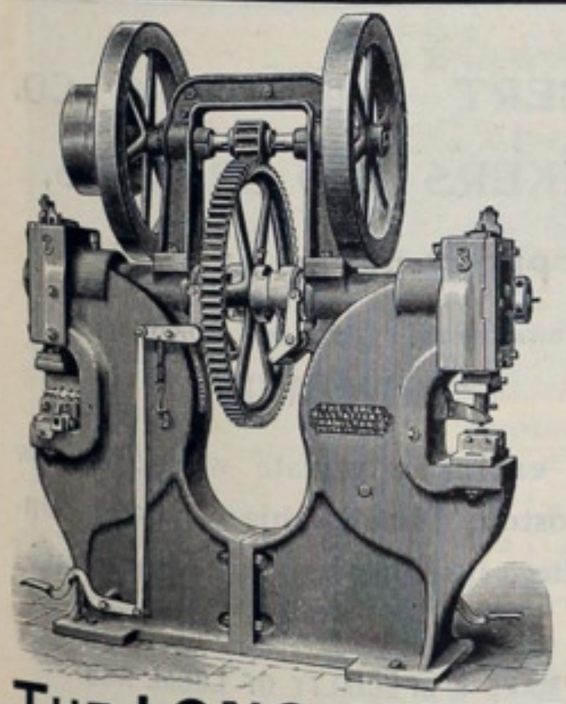

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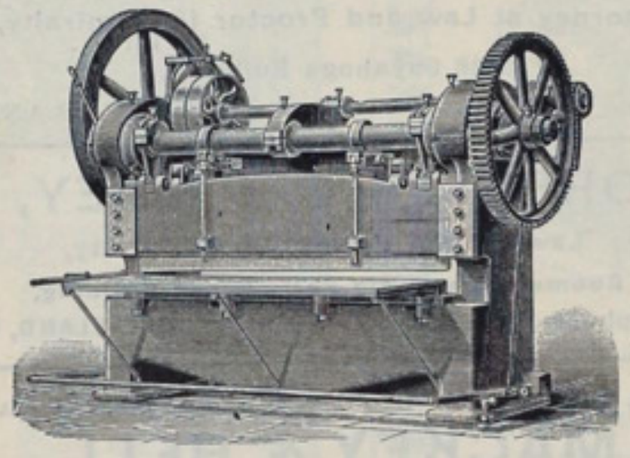

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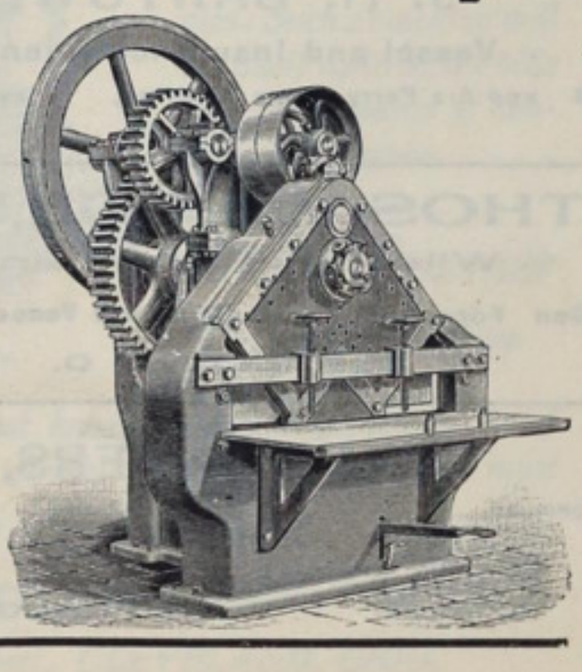

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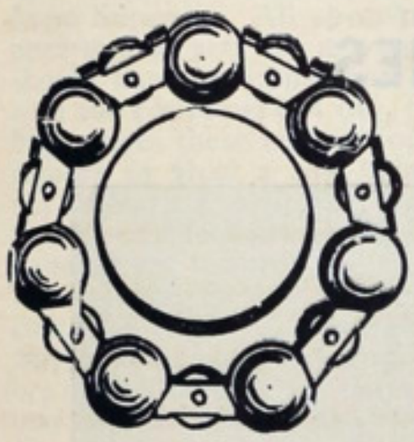

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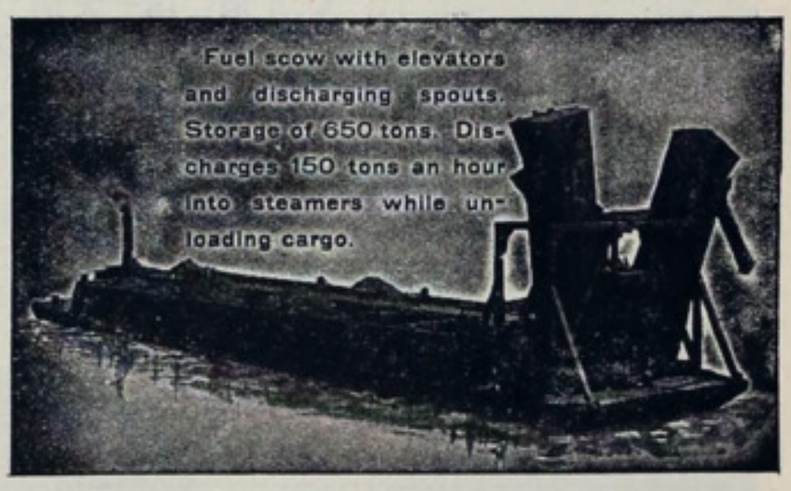
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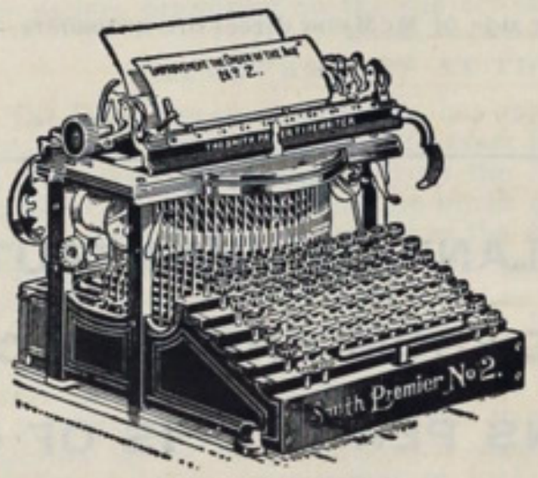

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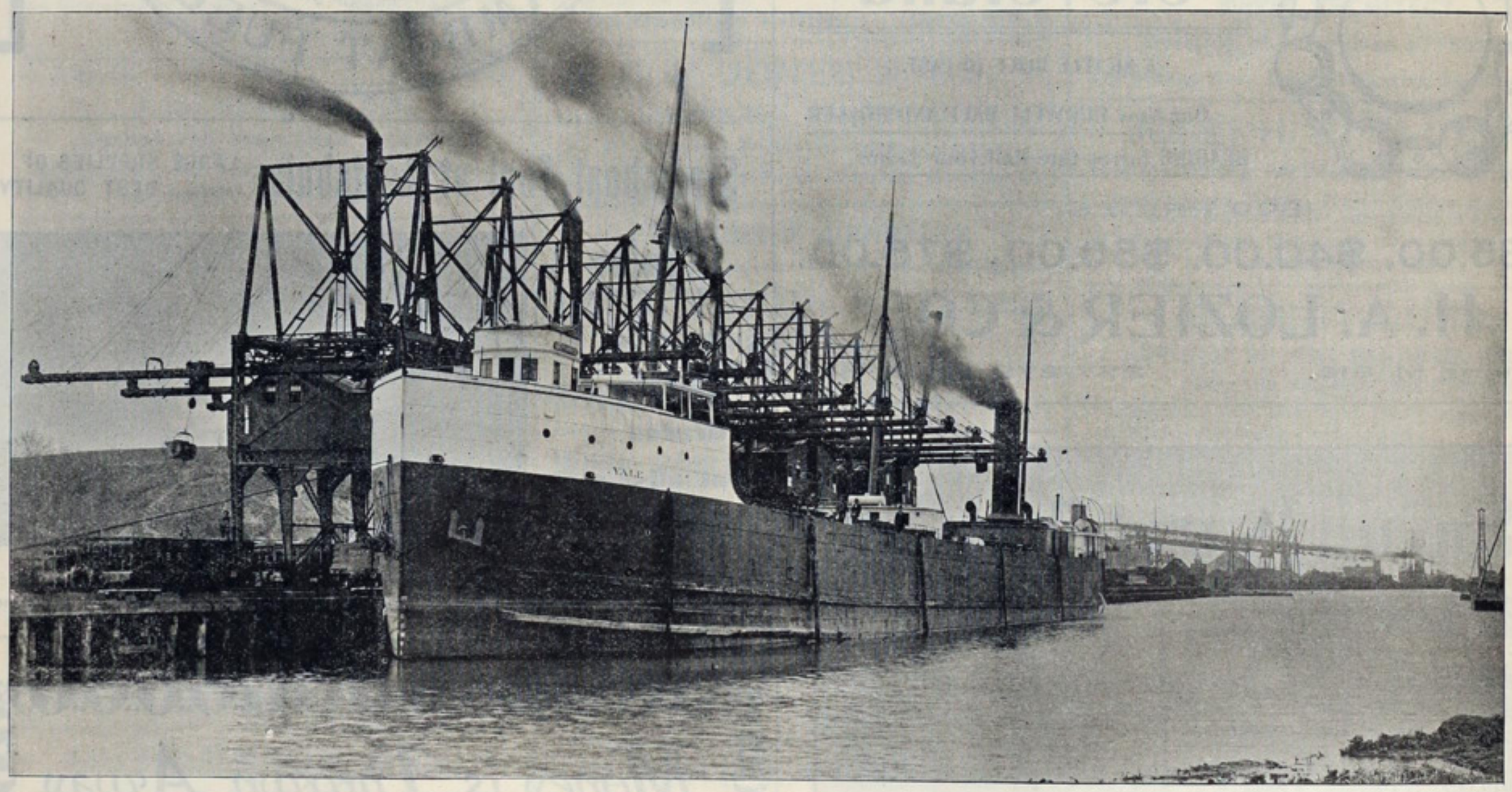

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